

## **POOR LEGIBILITY**

ONE OR MORE PAGES IN THIS DOCUMENT ARE DIFFICULT TO READ  
DUE TO THE QUALITY OF THE ORIGINAL

SFUND RECORDS CTR  
3417-00105

AR00038  
88202329

SFUND RECORDS CTR

88202329

A008440

---

BIENNIAL REPORT

OF THE

STATE MINERALOGIST

OF THE

STATE OF NEVADA,

FOR

THE YEARS 1871 AND 1872.

---

12760

## MILLS.

I am indebted to Mr. Samuel Doake, of Virginia City, who has kindly prepared the following tabular statement of the mills in Storey County:

Name of Mill.	No. of Stamps.	No. tons per day.	Location.	Crushing Ore, from.
Boston .....	5	.....	Gold Cañon.....	..... Empire, Gold Hill
Ione .....	5	15	Gold Cañon.....	..... Crown Point Croppings
Succor .....	15	25	Gold Cañon.....	..... Idle
Ramsdale .....	2	5	Gold Cañon.....	..... Woodside
Pacific .....	30	70	Gold Cañon.....	..... Belcher
Pappoose.....	5	14	Gold Cañon.....	..... Gold Hill Croppings
Piute .....	20	50	Lower Gold Hill..	..... Idle
Douglas .....	15	30	Lower Gold Hill..	..... Empire, Gold Hill
Atlas .....	15	45	Lower Gold Hill..	..... Savage
Petaluma .....	24	75	Lower Gold Hill..	..... Crown Point
Sapphire .....	15	40	Lower Gold Hill..	..... Crown Point
Rhode Island.....	25	50	Lower Gold Hill..	..... Crown Point
Gold Hill Quartz.....	8	18	Lower Gold Hill..	..... Idle, out of wood
Sunderland.....	10	25	Lower Gold Hill..	..... Belcher
Hoosier State.....	18	40	Virginia .....	..... Savage
Sierra Nevada.....	20	50	Virginia .....	..... Sierra Nevada
Evans .....	5	13	7-Mile Cañon.....	..... Savage
Mariposa.....	12	30	7-Mile Cañon.....	..... Hale & Norcross
Sacramento & Meredith..	20	50	Cedar Hill .....	..... Idle
Winfield .....	20	50	7-Mile Cañon.....	..... Chollar
Atlantic.....	12	30	7-Mile Cañon.....	..... Idle
Landy .....	20	50	7-Mile Cañon.....	..... Chollar
De Lands .....	15	35	6-Mile Cañon.....	..... Idle
Nevada .....	20	50	Virginia .....	..... Chollar
Empire State.....	15	40	6-Mile Cañon.....	..... Idle
Park & Bowie, No. 1 .....	.....	.....	6-Mile Cañon.....	..... Tailing Mill
Park & Bowie, No. 2 .....	.....	.....	6-Mile Cañon.....	..... Tailing Mill
Occidental .....	20	50	Silver Star Dist..	..... Tailing Mill
Lady Bryan.....	10	.....	6-Mile Cañon.....	..... Idle
Total, 29 mills.....	399	1,001		

## WASHOE COUNTY.

This county is north of Ormsby. It takes its name from a tribe of Indians who inhabit the western portion of the State. A few mining districts have been organized within its boundaries, at different times, but none of them have ever been a source of much profit. The wealth of this county consists chiefly in its agricultural resources and timber lands. Formerly, the streams of water flowing from the cañons in the Sierras into Washoe Valley were made available for milling purposes, in reducing the ores from the Comstock; and at one time no less than ten mills, having an aggregate of two hundred and eighty-one stamps, were in active operation in this county—some of these, moreover, were of the largest size, and first-class in all their appliances. The Ophir Company's Mill, of seventy stamps capacity, and built at a cost of a half million dollars, and Dall's Mill at Franktown, having sixty stamps, were among

the first mills in the State. Since the completion of the Truckee Railroad, however, ore can be delivered so much cheaper to the mills on the Carson River, that with the exception of the Truckee Mill, near Reno, and one or two tailing mills in Washoe Valley, nearly all these mills have been dismantled and abandoned.

## RENO

Is the county seat, and is situated on the line of the Central Pacific Railroad. From this point all supplies used in the southwestern section of the State are forwarded, as well as to Douglas, Ormsby, Lyon, and Storey Counties. It is pleasantly located on the banks of the Truckee River, and has many natural advantages for maintaining itself as a prosperous town.

## WADSWORTH

Is situated thirty-five miles further east, on the line of the railroad. There are located here the repair and machine shops for the Truckee division of the Central Pacific Railroad. From this point freight is shipped to Belmont, Ellsworth, and Columbus; and all the soda and borax obtained in Churchill and Esmeralda Counties are forwarded to this place for shipment to the markets.

## WASHOE CITY,

Formerly the county seat, Ophir, and Franktown, since the decline of milling enterprises in this county, are not so flourishing as they were some years ago.

The following interesting description of the agricultural and other resources of this county has been condensed from the columns of the *Nevada State Journal*, a well edited weekly newspaper published at Reno:

It may be said that Washoe County embraces an area of one thousand five hundred square miles and that of this extent not less than from eight hundred to one thousand square miles will ultimately be found valuable for agricultural and grazing purposes. We think we are speaking within proper bounds of truth, for, in fact, it is difficult to say what noticeable portion of the entire county is not to a greater or less extent fit for grazing. Of the fine arable land (by which we mean land so situated, of proper richness, that crops may be raised by irrigation) we think that there are between three hundred and four hundred square miles. Notwithstanding the rather extensive reclamation and cultivation of lands in Washoe Valley and Truckee Meadows, we do not believe that one fourth of our arable lands have been yet tested to anything like their reasonable capacity for farming operations. The surface of the county alternates in mountain range, valley, hill, and lake. The eastern range of the Sierra Nevada Mountains were ten years ago clothed from valley to summit with forests of excellent pine timber. Since then, great inroads have been made among these fine trees for the procuring of lumber, mining timber, and wood, but enough yet remains in the southwestern portion of the county to form an extensive source of supply for the same purposes, and all accessible to labor and capital. The extreme southwest corner of the county is found within the limits of the remarkable and beautiful Lake Tahoe,

✓ NEVADA:

THE

LAND OF SILVER.

BY

JOHN J. POWELL,

AUTHOR OF

"The Golden State and its Resources."

SAN FRANCISCO:

BACON & COMPANY, BOOK AND JOB PRINTERS,

Corner Clay and Sansome Streets.

1876.

## STOREY COUNTY.

NAME.	LOCATION.	MOTIVE.	STAMPS.	TONS PROD.
Boston .....	Gold Cañon ...	Steam	5	5
Ione .....	"	"	5	15
Succor .....	"	"	15	25
Ramsdale .....	"	"	2	5
Pacific .....	"	"	30	70
Pappoose .....	"	"	5	14
Piute .....	Lower Gold Hill	"	20	50
Douglas .....	"	"	15	30
Atlas .....	"	"	15	45
Petaluma .....	"	"	24	75
Sapphire .....	"	"	15	40
Rhode Island .....	"	"	25	50
Gold Hill Quartz .....	"	"	8	18
Sunderland .....	"	"	10	25
Hoosier State .....	Virginia .....	"	18	40
Sierra Nevada .....	"	"	20	50
Evans .....	Seven-mile Cañ.	"	5	13
Mariposa .....	"	"	12	30
Sacramento & Meredith	Cedar Hill .....	"	20	50
Winfield .....	Seven-mile Cañ.	"	20	50
Atlantic .....	"	"	12	30
Landy .....	"	"	20	50
De Lands .....	Six-mile Cañon.	"	15	35
Nevada .....	Virginia .....	"	20	50
Empire State .....	Six-mile Cañon.	"	15	40
Park & Bowie No. 1 ..	"	"	..	..
Park & Bowie No. 2 ..	"	"	..	..
Occidental .....	Silver Star Dist.	"	20	50
Lady Bryan .....	Six-mile Cañon.	"	10	..

PACIFIC  
MILL & MINING.  
COMPANY.

*Schedule of Property*  
*(Real Estate, Mills, &c.)*  
*owned by*  
*Pacific Mill & Mining Company.*  
*1876.*

*( For Certificate of Incorporation of Pacific Mill  
and Mining Company, and Certified List of its Officers,  
see Pages 170 + 176 ).*

AD10545

.45-

Sever of  
Bar. aments  
Mill  
to  
May 1<sup>st</sup> 1876.

Sierra Nevada S. My Co.

to

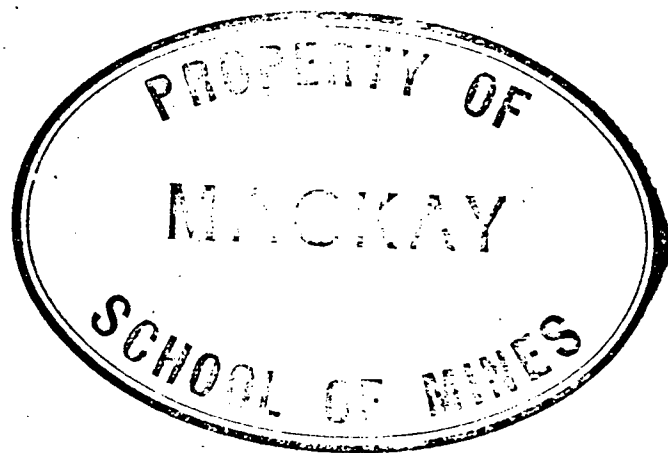
A010192

Mackay, Fair Co.

to

Pacific Mill & My Co.

July 30, 1874



**BRITTON & CO.**

*Lithographers.*



*Montgomery St. cor. Commercial*  
**SAN FRANCISCO.**

A011011

FIRST DIRECTORY OF  
**NEVADA**  
**TERRITORY**

NEV  
F 839.5  
K4  
1962  
C. 2

CONTAINING:

THE NAMES OF RESIDENTS IN THE  
PRINCIPAL TOWNS; A HISTORICAL SKETCH;  
THE ORGANIC ACT, AND OTHER POLITICAL MATTERS  
OF INTEREST; TOGETHER WITH A DESCRIPTION  
OF ALL THE QUARTZ MILLS; REDUCTION WORKS,  
AND ALL OTHER INDUSTRIAL ESTABLISHMENTS  
IN THE TERRITORY; AS ALSO OF THE LEADING  
MINING CLAIMS; AND VARIOUS MINERAL DISCOVERIES,  
WORKS OF INTERNAL IMPROVEMENTS, ETC.,  
WITH A TABLE OF DISTANCES, LIST OF PUBLIC OFFICERS,  
AND OTHER USEFUL INFORMATION.

COMPILED FROM THE MOST RECENT  
AND AUTHENTIC SOURCES;

by J. WELLS KELLY

AND INCLUDING  
SKETCHES OF THE WASHOE  
**SILVER MINES**

by HENRY DE GROOT

Nevada  
Coll.

INTRODUCTION

by RICHARD LINGENFELTER

THE TALISMAN PRESS

Los Gatos, California 1962

theatre, court-house, several flourishing schools, and a number of other institutions for the advancement of educational and religious interests, or the promotion of social pleasures. The Virginia City Water Company have laid their pipes through the greater part of the town, supplying from springs in the vicinity a sufficiency pure and wholesome water for all domestic purposes, while the tunnels furnish an inferior quality for the use of the mills, irrigation, etc. With this supply the health of the inhabitants will not suffer, as has heretofore been the case, from the use of bad water. A company has also been incorporated for furnishing the city with gas, to be manufactured from the Whitman coal, which has been found well adapted to that use. From Virginia City good wagon roads radiate in every direction, rendering it of easy access from all parts of the Territory as well as California. It is made the terminus of several railroads now projected, and some of which will soon be built, adding much to its prospective consequence, not only as a mining town, but also as a commercial depot and point of distribution. With the railroad completed to Washoe Valley, freight destined for Virginia will find its way to that point over the Henness and Truckee turnpikes, now being constructed, and to be opened at an early day, thus making the passage of the mountains with greater expedition and economy than at present. Virginia City was incorporated under the statutes of Utah Territory in February, eighteen hundred and sixty-one. The election for trustees came off March eleventh, resulting as follows: N. W. Winton, President; J. C. Bateman, Secretary; George H. Shaw, Joseph Scates, Louis Feusier, Trustees; C. P. Robinson, City Treasurer; D. Bailey, Marshal and Street Commissioner; Joseph F. Atwill, Justice of the Peace—all elected for the term of one year. As the prosperity of the city is wholly dependent on the mines, and as the great agent for making these available is the quartz mills, we append a list of the latter, now complete and running in the District.

#### Quartz Mills.

The mills and reduction works of the Ophir, one of the leading companies here, are, as has already been stated, situated

in Washoe Valley, sixteen miles west of Virginia City, with which they are shortly to be connected by means of a railroad.

**SPANISH COMPANY'S MILL.** This establishment, one of the largest and first erected in the Territory, is located in the north-eastern part of the town, about one hundred yards below their tunnel, and consists of a crushing mill with sixteen stamps, driven by a forty-horse power engine, and an amalgamating department containing twenty barrels, working the Freyburg and also the Thayer processes. It crushes from ten to fifteen tons of rock per day, employing sixty hands, divided into two gangs, working day and night. There are also a number of hands employed getting wood, salt, etc., for the works. The main building is thirty-eight by eighty-eight feet, two stories high, besides which, there are several large out-buildings. The cost of the mill and appurtenances is seventy thousand dollars; monthly expenses about sixteen thousand dollars. It was built by Mr. Henderson, formerly of Grass Valley, in the short space of two months. The following persons are employed in the capacities named: Theodore Winters, Superintendent; Mr. Tompkins, Foreman of Mill; Harvey Beckworth, Foreman of Mine; Mr. Beslit, Superintendent of the Freyburg, and Mr. Marshall, of the Thayer Process.

**CENTRAL COMPANY'S MILL.** This company was incorporated under the laws of California, October first, eighteen hundred and sixty, by the name of the Central Silver Mining Company; capital five hundred and forty thousand dollars. The mine, consisting of one hundred and fifty feet of the richest portion of the Comstock Ledge, is under the charge of Mr. Holland Day; Elliott J. Moore, President; G. W. McHenry, Secretary; W. H. Godfrey, Superintendent. This mill was constructed by I. S. Parke, in the latter part of eighteen hundred and sixty, and commenced operations the following January. The edifice, including wings, is one hundred and forty by thirty feet. Ten stamps are in use—Howland's Battery, driven by a ten horse power engine. Separate apartments are used for the crushing, smelting and assorting operations. Twenty men are employed in the mill, and an equal number

about the mine; seven tons of rock are worked daily, and the product of the mine since being opened is about one hundred and fifty thousand dollars. "The Veatch Process," an improvement on the Freyburg, being both cheaper and more effectual, is used in this establishment, under direction of Mr. Andrew Veatch.

**GOULD AND CURRY MILL.** The mill of this company is located about two miles northeast of Virginia City, on an inclosed flat of sixty acres, and with its numerous out-buildings and houses for workmen, presents the appearance of a small town. The main edifice, in the shape of a cross, is two hundred and fifty feet long, with wings seventy-five feet each, being the largest building in the Territory. It is divided into compartments,—that for the work of amalgamating under the charge of Capt. S. Tyler, being eighty-seven and one half feet deep and fifty feet wide, two stories high. The center of the building, occupied by the batteries, is one hundred and twenty-five by fifty feet, and contains eight batteries of five stamps each, capable of crushing forty tons of ore per day. The engine of one hundred and fifty-horse power, and very perfect workmanship, is from the Pacific Foundry, San Francisco. There are six furnaces and three boilers, the latter twenty-six feet long and forty-two inches diameter, with fourteen-inch flues. The engine room is of the same size as the amalgamating department. The mill, under superintendence of R. G. Carlyle, employs sixty men, working by relay night and day. The ore house and drying department is one hundred by eighty feet. A feature of this establishment is the perfectness that marks it in every department and operation, and the great economy of labor secured thereby. It not only exceeds in capacity any other quartz mill in the Territory, and perhaps in the world, but also surpasses all others in the completeness of its parts. The Veatch Process is employed. The mining operations are under the efficient and very successful management of Mr. C. L. Strong.

**OGDEN & WILSON Co.'s MILL.**—This mill, situated about one quarter of a mile below the town, was put up by George

L. Fuller for the Company in November, 1860, being the first mill completed in the District. The main building is forty by eighty feet, with an extensive shed having a chute for conveying the rock to the batteries. An engine of twenty horse power drives eighteen stamps, crushing twelve tons of rock per day. The rock, after being crushed, is carried by elevators to the second story, where it is bolted into a receiver, and thence conveyed to the amalgamators on the lower floor, an arrangement that saves much manual labor. The erection of this mill, with the necessary adjuncts, cost about forty thousand dollars.

A small mill located near and constructed upon the same plan as Ogden & Wilson's, and intended for custom work, was erected shortly after the latter. The building is twenty-six by forty feet, and has six stamps, propelled by a twelve horse power engine. The establishment cost about twenty thousand dollars, employs six hands, and is under the superintendence of J. T. Brown.

**THE CEDAR HILL MILL,** owned by Patterson & Land, is situated on Cedar Ravine, one mile west of Virginia. It employs eight men; has four straight batteries, four stamps each, and crushes twenty tons, running night and day. The engine, forty horse power, comes from the Pacific Foundry, San Francisco. In the amalgamating department there are eight Knox's Improved Pans. The Jeffrey process is used. This mill does custom work, and cost about thirty-five thousand dollars.

**THE MARIPOSA QUARTZ MILL**—Goodman & Hubbell, proprietors—is located at the foot of Cedar Hill. It is propelled by a fifteen horse power steam-engine, driving twelve stamps of six hundred pounds each, and crushing fifteen tons of rock per day. Knox's pans and the Hungarian Bowls are used in the amalgamating department, the pulp being also subjected to a steaming process, as heretofore practiced by the proprietors. Cost of mill about twenty thousand dollars.

**THE EMPIRE MILL,** a short distance east of the town—O. F. Griffin, Mark Sheldon and W. H. Graves, proprietors—runs

sixteen stamps, driven by a powerful steam-engine, crushing twenty tons of rock per twenty-four hours. This company purchase their ore, employ twenty hands, and use the Veatch Process, Wakelee's pans. Cost of mill, forty thousand dollars. W. H. Graves, Superintendent; W. T. Stephens, engineer; W. H. Bevins, foreman. The company are building a new road to their mill; and intend soon to double its crushing capacity, as they have sufficient propelling power to do so.

Three quartz mills are in course of construction in Seven Mile Cañon, within the limits of Virginia District. Of one of these, Booth & Co., formerly of Eureka, Nevada County, are proprietors. Of another, Patterson & Co. are proprietors. This is a large sized mill and nearly completed. The entire cost of these mills will be between seventy-five and one hundred thousand dollars. Their aggregate capacity will be about fifty horse power.

#### FLOWERY DISTRICT.

This District, lying east and adjoining the Virginia Mining District, was laid out in the fall of '59, a great many good-looking ledges having been found there, several of which have since been opened and proved to be rich in gold and silver. Many of the claims at first taken up were afterwards abandoned as worthless; of those retained and prospected to a greater or less extent we may name the Lady Bryan, Rogers, Monte Cristo, Utah, Norman, Cherokee, Harrison, Flowery, Adriatic, Union, Aurora Borealis, Uncle Sam, Desert, Anglo Saxon, Humboldt, St. Johns, and Mammoth. The recent census showed this district to contain three hundred and thirty-nine inhabitants, a number that has since been largely increased. Running entirely across it is Six Mile Cañon, a deep ravine, through which, since the opening of the tunnels at Virginia, several hundred inches of water flow constantly. This water has led to the building of a number of steam quartz mills, and two or three others driven by water, which, besides enhancing the value of the mines, by giving employment to a great many hands, have caused a small town, called Flowery City, to spring up at a point about half way down the cañon. It is a smart

little place, as indeed the whole ravine is an active and bustling locality, both by means of the numerous mills along it, and the fine road leading from Virginia to Carson River, and the Butte or Whitman Coal Fields, extending its entire length.

#### Quartz Mills.

The following are the quartz mills now in operation in this District:

SUNCOOK MILL—A. Bassett & Co., owners—located a short distance below the Gould & Curry Mill; building fifty feet by forty; four straight batteries, sixteen stamps, driven by a thirty horse power engine, from Pacific Works, San Francisco; crush twenty-four tons every twenty-four hours; employ ten men and use sixteen Varney pans for amalgamating. A. Bassett, superintendent; S. Kellogg, engineer.

WINFIELD MILL—L. A. Booth, proprietor. This is a steam mill, being driven by a forty horse power engine, intended to run twenty stamps, though but eight are now in use, and to crush twenty tons of rock per day. In amalgamating, forty Bertola pans are used. Seven men are employed. John Leavitt, superintendent; M. L. Remington, engineer.

EMPIRE STATE MILL—R. M. Billett & Co., proprietors—situated at foot of Sugar Loaf Peak. Both water and steam are used for propelling this mill, either being available for that purpose. The water-wheel is forty feet in diameter, and the engine of twenty horse power. The mill employs eight hands, runs ten stamps, and crushes twelve tons per day. The company purchase ore or crush rock for customers. They use Knox's amalgamators and Howland's patent flues.

SUGAR LOAF MILL—Rafael Cardenas, José Ma Ruiz, and Francisco Llaguna, proprietors—near Sugar Loaf Peak; driven by water falling on an overshot wheel and generating about a twenty horse power. The mill has four stamps, employs three men, and uses what is known as the Mexican process in amalgamating the ores. It has thus far been successful in its operation, and is soon to be enlarged, as the power is sufficient to carry eight or ten stamps.

Nebraska State  
Historical Society

## MERCANTILE GUIDE

AND

# DIRECTORY

FOR

Virginia City, Gold Hill, Silver City

AND

AMERICAN CITY,

COMPRISING

**A General Business and Resident Directory  
for those Cities, with Sketches of  
their growth, development  
and resources.**

ALSO CONTAINING

**Valuable Historical and Statistical Matter  
OF UNUSUAL INTEREST,**

TOGETHER WITH THE ONLY

**ACCURATE MINING DIRECTORY**

YET PUBLISHED,

*Giving the name of the Mine, number of feet in each  
claim, the District in which the same is located,  
and the names of Secretaries, with their  
respective places of business.*

---

COMPILED BY

**CHARLES COLLINS.**

---

**VIRGINIA:**  
1884-5.

PRINTED BY LEWIS & DENTON, BOOK AND JOB PRINTERS, 511 SANBORN STREET, S. F.

A008000

**Territorial--County and City Officials.**

Below will be found a list of the various Federal, County and City Officials; likewise the names of heads of Fire Department of Virginia.

Capital of the Territory—Carson.

SUPREME COURT—George Turner, Chief Justice; Jno. W. North, Associate Justice; Powhattan B. Locke, Associate Justice; Alfred Helm, Clerk.

TERRITORIAL OFFICERS—Jas. W. Nye, Governor and Superintendent of Indian Affairs; Orion Clemens, Secretary; J. T. Lockhart, Indian Agent; W. W. Ross, Auditor; Jno. H. Kinhead, Treasurer; A. F. White, Superintendent of Public Instruction; Robert Howland, Warden of Territorial Prison.

U. S. REVENUE OFFICERS—Warren Wasson, Assessor, Carson; James S. Dilley, Collector, Virginia.

U. S. LAND OFFICERS—Clement T. Rice, Register, Carson; O. N. Noteware, Receiver, Carson.

U. S. MILITARY—J. L. Van Bokkelen, Provost Marshal General.

MILITIA OFFICERS—J. W. Nye, Commander-in-Chief; J. L. Van Bokkelen, Major-General, at Virginia; Almon Hovey, Brig. General 1st Brigade, at Virginia; Jas. McLean, Brig.-General 2d Brigade, at Genoa; H. P. Russell, Adjutant General, at Carson.

FIRST JUDICIAL DISTRICT—Comprising Storey, Washoe and Roop counties—John W. North, Judge; George King, Clerk, at Virginia; J. S. Bowker, Deputy Clerk, at Washoe City.

COUNTY OFFICIALS—Leonard W. Ferris, Probate Judge; Wm. H. Howard, Sheriff; N. W. Winton, County Clerk, ex-officio County Auditor, Clerk Probate Court, and Clerk of the Board of County Commissioners; Chas. H. Fish, Recorder; Lloyd Frizell, Assessor; John Easterling, Tax Collector; Isaac E. James, Surveyor; Dighton Corson, Prosecuting Attorney; H. H. Flagg, Martin White, and Chas. H. Knox, Board of County Commissioners.

TOWNSHIP OFFICERS—*Gold Hill Precinct*—S. A. Kellogg, Justice of the Peace; Wm. H. Beegan, Constable. *Virginia Precinct*—J. F. Atwill, Justice of the Peace; J. V. B. Perry, Constable.

CITY OFFICIALS—Rufus E. Arick, Mayor. [Common Council—Meet every Tuesday evening—First Ward, John Earl, J. A. Cramer; Second Ward, Geo. H. Shaw, Jas. Brennan; Third Ward, Pembroke Murray, Alex. Coryell; Fourth Ward, Thos. Parker, R. A. Young.] Geo. F. Vosburg, City Clerk; F. Walters, City Treasurer; Chas. R. Edwards, Assessor; H. K.

HODGE & WOOD, Wholesale Stationers, 418 & 420 Clay St., S. F.

Alexander, Tax Collector; C. P. Johnson, Surveyor; John Allman, Street Commissioner; Frank Tilford, City Attorney.

CITY POLICE, ETC.—Wm. H. Davenport, Recorder; Chas. W. Cooke, Marshal and Chief of Police; E. F. Clarkson, Captain of Police; City Jailor, M. J. Purcell. *Regular Police*—H. W. Ward, John Brinton, Thomas Buckley, Wm. McIntosh, Thomas Bulger, Thos. McGee, Denis Hays, B. J. Lynch, Thos. Green, — Dale, — Clancy, Frank Soule, E. F. Hawks, — Wilcoxon. City Marshal is Chief of Police.

**Quartz Mills and Hoisting Works.**

GOULD & CURRY MILL AND MINE, situated about one and a half mile east of Virginia City. This is the most extensive mill in the Territory, or perhaps in the world. The mill, at present, runs eighty stamps. It is estimated that this company extract from their ores about a half million bullion monthly. The company employ about 800 men. The mine has three entrances—the lower, the middle, and the upper tunnels. At the mouth of the middle tunnel, which is situated on South I street, large and extensive quartz houses have been erected. A. Lawton, President; Chas. Bonner, General Superintendent.

MEXICAN MINE, situated between Howard and A streets, was erected in 1863, has a 25-horse power engine, and the company own 100 feet on the Comstock lode. Alsopp & Co., Proprietors; E. B. Darsey, Superintendent.

MARIPOSA QUARTZ MILL, located at the foot of Cedar Hill; it has a 15-horse power engine, running 12 stamps of 600 pounds each. Knox's pans and the Hungarian bowls are used in the amalgamating department. Cost of mill about \$20,000.

HOOSIER STATE MILL, situated on Silver, between G and H streets, was erected in 1862—engine 40-horse power. The machinery was formerly used in the old Spanish Mill, runs 8 stamps, and 24 Knox's pans—was erected in 1862. Jacob Clark & Geo. Hurst, Proprietors; J. Clark, Superintendent.

CEDAR HILL MILL, located in Cedar Ravine, has a 40-horse power engine, built at the Pacific Foundry, San Francisco, three straight batteries of four stamps each; crushes 16 tons of rock per day; it has 12 6-foot amalgamating tubs, with 8 Knox's improved pans. The mill was erected at a cost of \$35,000.

EMPIRE STATE MILL, situate at what is known as Sugar Loaf Peak, is run by both water and steam. The water wheel is 40 feet in diameter, with a 15-horse power engine; runs 10 stamps, and crushes about 12 tons of rock per day. It uses Knox's pans, with false bottoms, and Wakelee's patent flue pans; employs 10 men. Chas. Coover & L. Dunn, Proprietors. L. Dunn, Sup't.

Dealers in Blank Books, Legal and Commercial Blanks.

UTAH MILL AND HOISTING WORKS was erected on the 8th of January, 1864; size of building, 106 by 60, is situated in Six Mile Cañon, north of Silver Hill. They own 3,200 feet in three ledges, viz., 1,000 in the Comstock, 1,000 in the middle and 1,200 in the back ledge. The engine and machinery, which is rated as first class, and finely finished, is 90-horse power, was made by Devoe, Dinsmore & Co., of San Francisco. The main shaft of this company's mine has three apartments, each 4 by 5, and is down a depth of 28 feet.

MARIPOSA MILL, erected in 1861, situate in Cedar Ravine, has a 25-horse power engine, 12 stamps, and 18 amalgamating pans, (Wakelee's patent,) employs 10 men. Messrs. Davis & McCurdy, Lessees.

BAJAZETTE & GOLDEN ERA G. & S. M. Co., Bajazette Ledge, located in 1860. Golden Era Company (Mitchell Ledge) located 21st January, 1861. B. & G. E. G. & S. M. Co., consolidated Oct. 1862, and incorporated 26th January, 1863. Capital stock, \$1,200,000, divided into 4,000 shares—one foot to the share; have 2000 feet in each location, making a total of 4000 feet. The works are located on C street, north of Virginia and Gold Hill Divide. F. F. Fargo, Secretary, office 45 South C street, Virginia.

CALIFORNIA MINE & HOISTING WORKS, was located in 1859; has two mines—the North and South Central. The Hoisting Work's building is large and capacious, and was erected in 1863. Messrs. Bolton, Barron & Co., Proprietors. Wm. Welch, Superintendent. This company own 300 feet in the Comstock ledge, and employ 30 men.

SANTERITA CLAIM, Ophir Hill, was located in 1862. The company are now engaged in developing their mine.

INTERIOR EXPLORING AND MINING CO., L. W. Ferris, President; M. A. Baldwin, Superintendent; J. M. Gearheart, Sec'y. Office in Taylor's Building. The officers of this company are all men of experience, and practical miners. This company was formed for the purpose of locating and developing mines; they also locate timber and agricultural lands, and mill and town sites. It is conducted similar to the Mount Davidson Tunnelling and Exploring Co., a company which has done more to develop the mineral resources of the Territory than any other company extant, and has proved both remunerative to its projectors and a benefit to miners. The I. E. and Mining Co. have already located some very valuable mines, and are now engaged in developing them.

BEACH AND PAXTON'S HOISTING WORKS, situated on Virginia Hill, was located in 1859. The company are developing their mine.

HODGE & WOOD, Wholesale Stationers, 418 & 420 Clay St., S. F.,

SIERRA NEVADA HOISTING WORKS, located in Cedar Ravine, was erected in October, 1863. It has two 30-horse power engines, manufactured at the Vulcan Iron Works, San Francisco. This company use for hoisting purposes a flat wire rope, three inches wide and one and a half thick, and 620 feet long.

ALLEN G. AND S. M. Co.—The works of this company were erected in 1862, are situated in Cedar Ravine, have all the machinery and facilities for developing their claim.

WHITE & CO.'S MILL AND HOISTING WORKS, is located on Cedar Hill, building 30 by 60, is worked by an improved horse whim; have located and own 210 feet on the Comstock lode; works erected December, 1863,

SAVAGE MINE AND HOISTING WORKS, situated on B street, was located in July, 1859; claim 800 feet on the Comstock lode; have an engine of 50-horse power; main building 36 by 60; carpenter shop 40 by 50. Wm. Lent, President; G. B. McAnney, Secretary.

POTOSI WORKS, situated on North B street, was located in 1859, has capacious and powerful hoisting machinery and works, own 1,400 feet on the Comstock lode. Patrick McKay, Sup't.

DICK SIDES SILVER MINING AND HOISTING WORKS, located 23d June, 1859, by T. B. Abernathy, J. M. Baldwin, E. Belcher, and R. D. Sides. The works are situated on South Stewart st., has first class hoisting machinery, built by Devoe, Dinsmore & Co., San Francisco, at a cost of \$100,000. The company was incorporated on 22d May, 1863. Office 48 South B street, Virginia.

CHOLLAR HOISTING WORKS, situated on North A street, claim located in 1860, owns 1,400 feet on the Comstock, has an engine of 100-horse power.

WM. PENN HOISTING WORKS.—The claim which was located in 1862, is situated on Virginia Hill, employs six men, and a horse whim.

BURNING MOSCOW HOISTING WORKS, situated North Ophir Hill; company have located and claim 2,400 feet on the Comstock lode. It has an engine of 12-horse power, and improved hoisting machinery.

NORTH OPHIR, situated on North Ophir Hill, claim 1,200 feet on the Comstock lode.

SOUTH OPHIR, situated on South Ophir Hill, claims 200 feet on the Comstock lode. A tunnel has been run from this claim to the North Ophir, from which is taken excellent rock. This company are about erecting new and costly machinery, which, when completed, will enable them to double their present capacity for extracting quartz.

School Books at Greatly Reduced Prices.

0008006

SECOND DIRECTORY  
OF  
NEVADA TERRITORY;

EMBRACING A

GENERAL DIRECTORY OF RESIDENTS

OF ALL THE PRINCIPAL TOWNS;

BUSINESS DIRECTORY OF ADVERTISERS;

QUARTZ MILLS, REDUCTION WORKS, TOLL ROADS, ETC.;

OFFICERS OF THE MASONIC, ODD FELLOWS AND SONS OF TEM-  
PERANCE ASSOCIATIONS; MEMBERS WASHOE STOCK BOARD  
OF EXCHANGE; FIRE DEPARTMENT;

INCORPORATION ACTS OF VIRGINIA AND GOLD HILL;

AND ALL OTHER INFORMATION CONNECTED WITH THE PROGRESS AND PRESENT  
CONDITION OF THE TERRITORY;

ALSO,

AN ACCURATE TABLE OF DISTANCES; LIST OF PUBLIC OFFICERS; AND  
PRINCIPAL MINING LAWS OF DIFFERENT DISTRICTS; WITH  
THE RESIDENTS AND PRINCIPAL MINES, MILLS,  
ETC. OF THE

REESE RIVER REGION.

COMPILED FROM THE MOST RECENT AND AUTHENTIC SOURCES,

BY J. WELLS KELLY.

VIRGINIA: A008097

1888.

Printed by Valentine & Co., 517 Clay and 514 Commercial Streets, San Francisco.

140887

hills to the east of Virginia, many shafts are being sunk and tunnels driven in to reach the ledge, which, in one instance—the St. John Company—has been struck, and is really valuable. Rock from this claim is being crushed at an arastra mill on Flowery Toll Road, and with good results.

In another portion of this work will be found a description of the different tunneling operations; and as the information was derived both from personal inspection and the most reliable sources, full confidence may be given to it.

As the prosperity of the county is wholly dependent on the mines, and as the great agent for making these available is the quartz mills, we append a list of the latter, now complete and running in the district. In continuation of our system, we first give those immediately situated in Virginia, following them up as they occur in their order. The more lengthy description of some is owing to the kindness of the owners or superintendents, to whom the author is indebted for the information.

#### Quartz Mills.

**HOOSIER STATE MILL.**—A. W. Pray, H. G. Blasdel & Co. Proprietors—situated below the mouth of the Santa Fé Tunnel is a very extensive concern. It was built in 1862, and has been running regularly ever since. The Company purchases rock, and also crush for customers. The latest improvements for amalgamating are employed in this mill. It is under the supervision of Mr. H. G. Blasdel, a gentleman of long experience in quartz mining and milling, and from the known enterprise of the proprietors, we do not doubt it is a profitable concern.

**GOULD & CARVILL'S MILL.**—Situated on corner Howard Street and Spanish Ravine. Built in 1861. Has ten stamps driven by a twenty-five horse power engine. Crush twelve tons per day, principally custom rock. The amalgamating process is conducted through six Wheeler pans. Employ nine men, and superintended by Mr. F. A. Parke.

**CENTRAL COMPANY'S MILL.**—This company was incorporated under the laws of California, October 1st, 1860, by the

name of the Central Silver Mining Company; capital, \$540,000. The mine, consisting of one hundred and fifty feet of the richest portion of the Comstock Ledge, is under the charge of Mr. John Pascoe. Present officers of the company are W. M. Lent, President; G. B. McAneny, Secretary; A. B. McCreery, W. M. Lent and O. H. Frank, Trustees. W. H. Godfrey, Superintendent. The reduction works are situated on D, Mill, and E streets, and inclosed by a substantial fence. Within the inclosure are several buildings used as office, assay room, storehouses, carpenter shop, and lodging rooms for the employees. There is also a large blacksmith shop, in which the entire work for mill and mine is executed. Building one hundred and fifty-two feet long by thirty wide, with two wings; the northern one being used for the smelting and retorting department, and the southern contains three reverberatory furnaces. In the west end is situated the engine room, in which is a splendid fifty-horse power engine, made by Devoe & Co., San Francisco. There are also two large boilers, which furnish steam for engine and amalgamating tubs. Adjoining is the battery-room, which contains a ten stamp straight battery—stamps five hundred pounds each—and two Brevoort's grinders; also, a powerful pump and hose for amalgamating and fire purposes. A salt mill capable of grinding ten tons per day, and a drilling machine, are also in this apartment. The capacity of the mill is from twelve to fourteen tons per day, and it has been running constantly, successfully engaged in working the richest ores from the Gould & Curry, Central, and Savage mines. From January 1st to April 30th, 1863, over five tons of bullion, valued at \$250,000, have been produced. The Freiberg process is used, with the exception of stationary tubs instead of barrels. At the mouth of the tunnel, from which all the ore extracted from their mine is carried into the mill, is a large reservoir containing twenty thousand gallons of water, supplied by the tunnel, and is covered by an engine house containing a fire engine and complete set of fire hooks and axes. Mr. W. H. Godfrey, General Superintendent.

Next below the Central, and following down Mill Street (or the Flowery Toll Road) is the

O'FARRELL MILL, published last year as the Ogden & Wilson. It was put up by George L. Fuller for that company, in November, 1860, being the first mill completed in the district. The main building is forty by eighty feet, with an extension shed having a chute for conveying the rock to the batteries. An engine of twenty-horse power drives eighteen stamps, crushing twelve tons of rock per day. The erection of this mill, with the necessary adjuncts, cost about forty thousand dollars.

To the right of the above, about fifty yards, is a small mill of six stamps, propelled by a twelve-horse power engine. In connection with this mill there are five acres of land. Both establishments are owned by Mr. William O'Connor.

EMPIRE MILL AND MINING CO.—This extensive establishment is situated a short distance below the O'Farrell, on Mill Street; cost of mill, over one hundred thousand dollars. The land about the mill, owned by the company, amounts to twenty acres, and being located immediately within the most improving portion of Virginia, is far more valuable than any other in the county. The building, a very large and substantial one, fronts upon the street, and in the rear, where the batteries are situated, and the ore delivered, the company have built a splendid road, crossing the cañon about one hundred yards above their office, which is a very neat and comfortable building. Having thus two entrances, no delay is occasioned by the waiting of teams, and everything goes on systematically. The company have two wood ranches, a short distance from Virginia, and owning the teams engaged in hauling quartz and wood, save to the stockholders a very considerable sum in the course of the year. The mill has sixteen stamps, and crushes thirty tons of rock per day. In the amalgamating department there are thirty-seven of Wakelee's patent improved pans, with steam chambers, working for both gold and silver. The mine belonging to this company is very valuable, they owning seventy-five feet of the celebrated Gold Hill proper; and in connection with the mine we must mention the fact of their being the only company who have yet struck the "front ledge" in the hill, although all the other companies are running in

tunnels for the same purpose. From specimens of the rock exhibited to us, we have no hesitation in saying it is a mine of almost fabulous richness. Owners of a mine immensely prolific, with such an extensive mill in close proximity, out of debt, and able to supply other mills than their own with their rich ores, this company would seem to be in the best possible condition for effecting advantageous sales of their property, if such be their purpose, or carry on their operations with eminent success. Employ in mine and mill nearly one hundred hands. Mr. R. N. Graves, Superintendent.

GOULD & CURRY MILL.—The works of this company occupy one of the most beautiful sites in the Territory; located one mile east of Virginia, on an inclosed piece of land, comprising sixty acres. This spot, selected with wise foresight, is peculiarly adapted, with its many natural advantages, to the reduction of gold and silver bearing ores. The grounds adjoining and surrounding the works are kept in a neat and orderly manner, an end easily attainable from the gentle slope of the land, combined with a perfect system of drainage. A noticeable feature, as elsewhere, around and in this establishment, is the abundant supply of water. This is obtained from reservoirs situated high up on the mountains, each side of the works. Prominent among the many buildings with which the grounds of this company are diversified, stand the Mill and Ore House. The latter building over one hundred by eighty feet, and forms quite a feature in the general plan. Here the ores from the mines are received, and after a careful drying, an operation performed by two kilns, each forty feet in length, they are taken to the mill in a car running over a track some fifteen feet from the ground. Between this building and the main works, there is a fall of ten feet; the division of the upper and lower grounds being made by an immense wall of stone, built with an evident eye to beauty as well as utility. The mill, or main edifice, is an imposing structure, of noble design, in the form of a cross, and is two hundred and twenty-five feet long, with wings eighty-seven and a half feet each, being the largest building in the Territory. Immediately over the center of each of the four wings, are placed ventilators, which

greatly conduce to the pleasantness of the interior. The inner works are divided into three compartments—the engine, crushing, and amalgamating departments. In the former are the engine and boilers, from which the whole power used in the works is obtained. The engine, a beautiful and perfect piece of workmanship, is from the Pacific Foundry, San Francisco. It is one hundred and fifty horse power. The boilers, three in number, are each twenty-six feet long, forty-two inches in diameter, with double flues fourteen inches. They are inclosed in furnaces built of a peculiar fire-stone found near the works. Directly under the main floor of the engine room are the fire and air pumps. The center of the building comprising the crushing department, is three stories high, running at right angles with the engine and amalgamating rooms. It is one hundred and twenty-five by fifty feet, and contains eight batteries of five stamps each, capable of perfectly crushing thirty tons per day. The drawback heretofore in dry crushing works—the suffocating clouds of dust arising from under the stamps—is here pleasantly avoided by the use of two powerful suction fans. In front of the batteries are four hopper-shaped bins, each holding about ten tons; into these the ore from the ore house is conveyed, and is delivered by its own gravity into the hands of the feeders. On the second floor, directly over the batteries, are situated the fine ore bins, four in number, with a capacity of twenty tons each. Into these the crushed ore, after being elevated and put through a peculiar sieving process, is deposited. Above these again, on the third floor, are ten more bins, for the reception of the dust taken from the batteries. This department is isolated, as it were, being separated from the engine and amalgamating rooms by brick walls rising from the foundations to the roof. The amalgamating room is eighty-seven and one-half by fifty feet, three stories high, and is justly admired as a model of arrangement, convenience, and regularity. The process employed in this establishment—invented and put in practical working by Capt. S. Tyler—is one not heretofore used, and is of undoubted merit and practicability. In this department, as in every part of these works, all the operations are conducted with system and skill. The ores to be treated, after a careful sampling and

weighing, are conveyed in cars, and deposited in seven large pans, on the upper or preparing floor; from thence, it descends to the middle, or amalgamating floor, where it is received in eight large tubs, with a capacity of ten tons each. On this floor, the amalgamation of the ores is completed, and by an easy transition descends to the first or finishing floor, on which are situated eight settling tubs, and twelve pans for washing up. Here the amalgam is received, and having been parted from its excess of mercury by hydraulic pressure, a method peculiar to this establishment, it is conveyed to the smelting house. In this building are situated the assay room, roasting, smelting, and retort furnaces. Here the amalgam, having passed through the successive stages of retorting, smelting, and assaying, is stamped and shipped to San Francisco. It is contemplated to increase this immense establishment to two-fold its present capacity. These works, as also the valuable mine belonging to this company, are under the efficient and successful management of Mr. Charles L. Strong.

Turning up Seven Mile Cañon, and into Cedar Ravine, we meet with the

WINFIELD MILL AND MINING Co.—Messrs. L. A. Booth and John Leavitt, proprietors. Has eight very heavy stamps, one thousand pounds each, crushing twenty tons per day. The proprietors intend shortly to still further increase its capacity by adding another ten stamp battery. Forty pans with steam chambers, and ten wooden tubs, comprise the amalgamating department. This company intend making the experiment of conducting the surplus steam from the escape pipe into the amalgamating tubs, thus saving fuel. The engine, a very fine one, of forty-five horse power, is from the Pacific Foundry, San Francisco. The pans are from the Iron Works of Goss & Lombard, Sacramento. This company is generally employed crushing rock from their own claim at Gold Hill, and work for both gold and silver. Twelve men are employed night and day. John Leavitt, Superintendent.

SUNCOOK MILL.—A. Bassett & Co. owners—located in Cedar Ravine, a short distance above the Winfield Mill. Built in

**A008119**

1861, and is one of the most fortunate in the Territory, having been constantly running since it was constructed. This company crush their own rock, and also do custom work. Has twelve stamps, driven by a splendid engine of thirty horse power, from the Pacific Works of San Francisco, and crushes eighteen tons of ore every twenty-four hours. Employ eight men, and use fifteen six-foot tubs for amalgamating, working for both gold and silver. A. Bassett, Superintendent.

**CEDAR HILL MILL**, Messrs. C. B. & Chas. Land, proprietors, is situated on Cedar Ravine, one mile west of Virginia. It employs ten men, has three straight batteries of four stamps each, and crushes sixteen tons, running night and day. The engine, forty horse power, comes from the Pacific Foundry, San Francisco. In the amalgamating department there are twelve six-foot tubs, and eight Knox's improved pans. This mill does custom work and cost about thirty-five thousand dollars. The owners being enterprising business men, keep their mill constantly employed, and supervise the concern themselves.

**THE MARIPOSA QUARTZ MILL**, is located at the foot of Cedar Hill; it is propelled by a fifteen-horse power steam engine, driving twelve stamps of six hundred pounds each, and crushing fifteen tons of rock per day. Knox's pans and the Hungarian bowls are used for amalgamating, the pulp being also subjected to a steaming process, as heretofore practiced by the proprietors. Cost of mill about twenty thousand dollars.

#### FLOWERY DISTRICT.

This District, lying east of and adjoining the Virginia Mining District, was laid out in the fall of '59, a great many good looking ledges having been found there, several of which have since been opened and proved to be rich in gold and silver. Many of the claims at first taken up were afterwards abandoned as worthless; of those retained and prospected to a greater or less extent we may name the Lady Bryan, Rogers, Monte Cristo, Utah, Norman, Cherokee, Harrison, Flowery, Adriatic, Union, Aurora Borealis, Uncle Sam, Desert, Anglo

Saxon, Humboldt, St. Johns, and Mammoth. The census of 1861 showed this district to contain three hundred and thirty nine inhabitants, a number that has since been largely increased. Running entirely across it is Six Mile Cañon, a deep ravine, through which, since the opening of the tunnels at Virginia, several hundred inches of water flow constantly. This water has led to the building of a number of steam quartz mills, and two or three others driven by water, which, besides enhancing the value of the mines, by giving employment to a great many hands, have caused a small town, called Flowery City, to spring up at a point about half way down the cañon. It is a smart little place, as indeed the whole ravine is an active and bustling locality, both by means of the numerous mills along it, and the fine road leading from Virginia to Carson River, and the Butte or Whitman Coal Fields, extending its entire length.

Following down the cañon from the Gould & Curry Mill, we have in this district the following mills now in active operation:

**SUGAR LOAF MILL**, owned by Martin Rancho, near Sugar Loaf Peak; driven by water falling on an overshot wheel, and generating about a twenty horse power. The mill has four stamps and two arastras, exclusively employed working rock from the St. John Claim in Silver Star District, and has thus far been successful in its operation. It will soon be enlarged, as the power is sufficient to carry eight or ten stamps. Employs three men, and uses what is known as the Mexican Process in amalgamating the ores.

**EMPIRE STATE MILL**.—Chas. Coover and L. Dunn, proprietors—situated at foot of Sugar Loaf Peak. Both water and steam are used for propelling this mill, either being available for that purpose. The water-wheel is forty feet in diameter, and the engine of fifteen-horse power. The mill employs eight hands, runs ten stamps, and crushes twelve tons per day. The company crush their own rock from Gold Hill. Use Knox's pans, with false bottoms, and Wakelee's patent flue pans, for amalgamating. Lathrop Dunn, Superintendent.

**ROGERS SILVER MINING Co.**, on Flowery Road, 3 miles east

ANNUAL REPORT  
267800V

OF THE

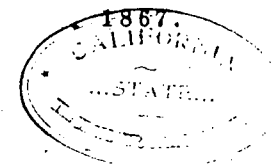
# STATE MINERALOGIST

OF THE

## STATE OF NEVADA

FOR 1866.

CARSON CITY:  
JOSEPH E. ECKLEY, STATE PRINTER.



# List of Mills in Nevada.

NAME.	Motive Power.	Cords of Wood pr Day.	No. of Stamps.	Weight of Stamps.	No. of Pans.	Nature of Pans.	Crushing Capacity per Day. Tons.	REMARKS.
<b>STOREY COUNTY.</b>								
Atlas.....	steam	4½	15	600	8	Hepburn	25	
Atwood.....	"	4½	16		26-2	Knox, Wheeler	20	
Bay State.....	"	6	23		14	Wheeler	35	
Bower's.....	"	4	20	10-600 10-700	30	Knox	25	
Central.....	"	8	13		4	Hepburn	12	
Crown Point.....	"	5	8	500	8	Knox	8	
Comet.....	"	4½	16			Plain	20	
Douglas.....	"	4	10	650	26	Hepburn	16	
Eclipse.....	"	4	15		8	Wheeler	25	
Empire, No. 1.....	"	5½	21	650	29	Knox, Hepburn	30	
Empire, No. 2.....	"	8	16	650	12	Wheeler	32	
Empire State.....	"	5	15		20-2-2	Knox, Wheeler, Hepburn	15	
Gold Hill.....	"	3	14	8-600 6-750	24	Knox	17	
Granite.....	"							
Gould & Curry.....	"	20	80		39-3	Hepburn, Varney	100	Refitting.
Hoosier State.....	"	3½	8	750	24	Knox	12	
Imperial.....	"	6	44	600	74	Knox	30	
Land's.....	"	5½	20		10	Wheeler	15	
Mariposa.....	"	4	12		2-6	Knox, Wheeler	18	
Marysville.....	"	5	9		30	Plain	20	
Ogden.....	"	6	22		12	Wheeler	50	
Pacific.....	"	8	30	650	15	Wheeler	26	
Petaluma.....	"	3½	16	700	18	Knox	30	
Piute.....	"	5½	20	650	12	Hepburn	40	
Rhode Island.....	"	8	25	650	13-8	Knox, Hepburn	12	
Rigby's.....	"	4	10		5	Varney	12	
Rogers'.....	"	3½	8				12	
Sapphire.....	"	5	16	750	56	Knox	28	
Simeoe.....	"	5	16		8	Tubs, Wheeler, Hepburn	25	
Stevenson's.....	"	2½	8	500	10	Knox	10	
Succor.....	"	6	20				26	

148

Summit.....	"	6	20	625	11-1	Wheeler, Varney	35	
Union.....	"	2½	14	10-650 4-500	14		14	
Winfield.....	"	5	18		8	Hepburn	30	
<b>LYON COUNTY.</b>								
Birdsall & Carpenter...	water	2	30	650	20	Wheeler	55	
Bacon.....	steam	6	20	650	17	Wheeler	30	
Bartolo.....	"	3	8	550	8	Knox	9	
Cole & Co.....	"	3	5	480	4	Wheeler	3	
Devil's Gate.....	"	5	8	900	10	Hepburn	14	
Daney.....	"	6	15	550	15	Wooden Tubs	20	
Dayton, No. 1.....	water	1	20	500	6	Wheeler	20	
Dayton, No. 2.....	steam	6	15	800	8	Varney	15	
Eagle.....	water		5	400	2	Knox	15	
Eastern Slope.....	steam	6½	16	800	6	Hepburn	20	
Excelsior.....	"	3	10	650	18	Knox	18	
Eureka.....	water		20	650	8	Wheeler	22	
Franklin.....	"	4	10	600	8	Knox	12	
Golden Eagle.....	steam	3½	10	850	25	Tubs	13	
Illinois.....	"	5	20	400	5	Hepburn	20	
Island.....	"	2	19	650	11	Tubs	14	
Lindauer & Co.....	st'm & water	2½	15	480	10	Wheeler	20	Dismantled.
Metallurgical Works...	steam	5	15	700	6	Wheeler	16	
Monitor.....	water		5	450	2	Wheeler	3	
New York & Nevada...	steam	5½	20	550	17	Hepburn	25	
Ophir.....	st'm & water	2½	24	600	15	Hepburn	35	
Pioneer.....	steam	6	15	700	15	Tubs and Wheeler	20	
Phoenix, No. 1.....	"	6	15	650	8	Tubs and Wheeler	19	
Phoenix, No. 2.....	"	7	20	534	34	Tubs	23	
Palmyra.....	"	4½	10	650	12	Tubs	15	
Rock Point.....	st'm & water	2½	58	550	50	Tubs and 6 Hepburn	60	
Sparrow & Trench.....	steam	6	20	600	19		25	
Sherman & Co.....	water		5	400	2		4	
Swansea.....	steam	5	14	900	22	Tubs	20	
Smith, D. L.....	water		5	450	4	Tubs	4	
Sacramento.....	steam	5	12	750	12	Tubs	18	
San Francisco.....	st'm & water	3	10	650	7	4 Tubs and Wheeler	14	
Weston & Co.....	steam	4	15	550	9	Wheeler	14	
Weston & Co.....	water		10	450	8	Tubs	11	

One of these Mills destroyed by fire during 1866.

A008517

149

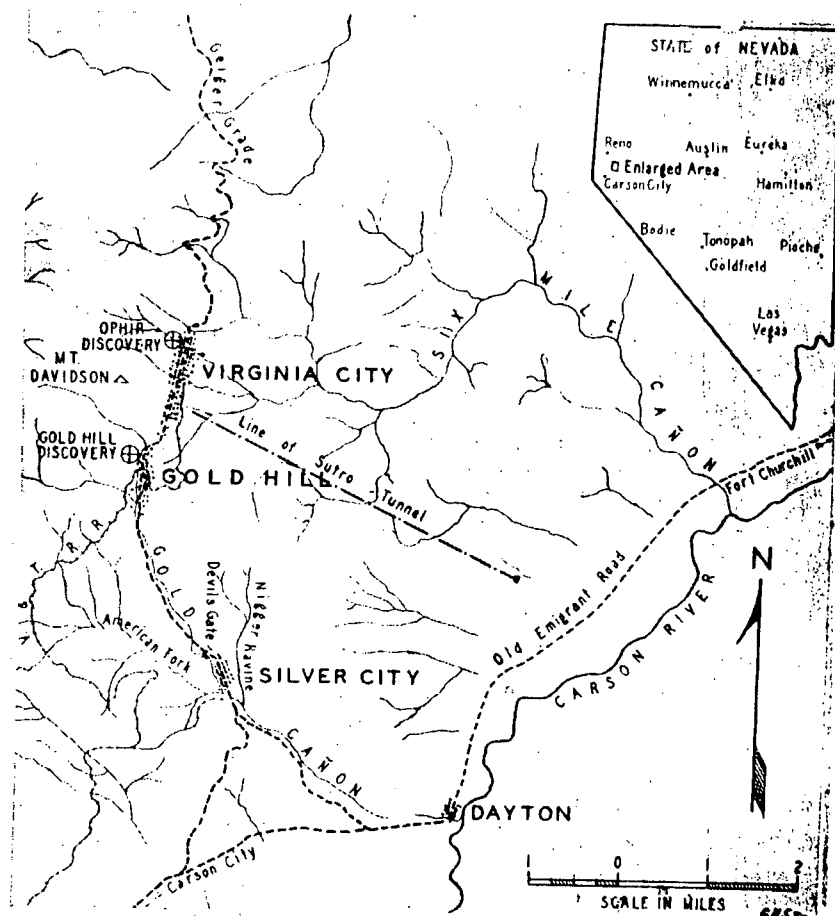
# THE HISTORY OF THE COMSTOCK LODE

1850-1920



NEVADA BUREAU OF MINES AND GEOLOGY

slope to uncover the six-inch layer of sand—"some of it black as soot," Penrod said, which yielded hundreds of dollars a day in gold. They cursed and threw aside the heavy bluish sand because it clogged their rockers, not knowing that it was rich silver sulphide. Then, about June 12, the pay dirt turned into a shattered, partly-decomposed mass of quartz and sand, stained with black



VIRGINIA CITY AND VICINITY

manganese and intermixed with heavy bluish-gray quartz. When this showed gold they pounded it up and washed the fragments through their rockers. They had never seen any of that "blue stuff" in the Gold Cañon placers, nor had any such ore ever been found in the mines in that vicinity. Dan DeQuille, who knew all of the early placer miners, wrote:

In mining in Gold Cañon they had been bothered with a superabundance of black sand and heavy pebbles of iron ore, but this new bluish sand was a thing which they had never encountered anywhere in the country.<sup>17</sup>

O'Riley and McLaughlin wanted to locate the ground as placers, 50 feet to each man according to the rules, but Penrod insisted that they had discovered a quartz vein and that it should be located as such, each of the four men taking 300 feet along the vein with an additional 300 feet for discovery. They measured off 1,500 feet with a piece of rope and set a stake at each end, which was all that was done to mark the boundaries. The Ophir notice of location was not recorded. Penrod states that a 100-foot strip was segregated from the Ophir claim, 200 feet from the south end, and given to him and Comstock for insisting upon locating the ground as a quartz claim and for the use of the spring. This 100 feet became the Mexican.

The slight value that the owners placed upon their mine is shown by the contract they made on June 22 with John D. Winters, Jr., and J. A. Osborn, whereby the latter were given a one-third interest in the Ophir for building two arrastras, worth \$75 each, in which to work the ore, together with two horses or mules to operate them.<sup>18</sup>

Not until June 27, when some of the "blue stuff" was assayed by Melville Atwood at Grass Valley, California, was it known to be rich in silver. J. F. Stone, a station-keeper on the Carson River and former Grass Valley quartz miner, who located the Sierra Nevada claim, had sent the quartz over by a rancher, B. A. Harrison, who gave it to J. J. Ott of Nevada City to assay. His test showed it to be worth \$840 to the ton. Harrison then gave a sample of the ore to Judge James Walsh, a prominent miner and mill owner at Grass Valley, who handed it to Melville Atwood to assay. The result of \$3,876 to the ton, three fourths silver and one fourth gold, was so startling that Atwood assayed it a second time. Walsh sought the advice of Richard Killala, "a distinguished Irish metallurgist" then living at Grass Valley,

<sup>17</sup>Dan DeQuille's *Big Bonanza*, pp. 40, 48, 55 (1876). Dan went to Gold Cañon in 1860 and lived at Silver City for a year. Shinn was misled in stating that the placer miners in Gold Cañon had been annoyed by "heavy blue stuff." He confused Gold Cañon with the Ophir Diggings. *The Story of the Mine*, p. 36 (1896). None of the early writers speak of "blue stuff" in the Gold Cañon placers, nor of any similar material.

<sup>18</sup>A copy of the contract is printed in Thompson & West *History of Nevada*, p. 57 (1881). It was recorded on June 22, 1859.

failed to materialize, for the ore body was later found to pitch northward.

### THE CALIFORNIA ORGANIZED AND MILLS BUILT

Based on the old California and the Kinney, together with the newly acquired Central and Central No. 2, a new company was organized in December 1873 called the California, with 108,000 shares, which was given the north 600 feet; the Con. Virginia retaining the 710 feet adjoining on the south.<sup>31</sup> As it turned out, all of the great bonanza lay in these two mines.

When the California Company was formed each stockholder of the Con. Virginia (which owned  $\frac{7}{12}$ ths of the new ground) received a dividend of  $\frac{7}{12}$ ths of a share of the stock of the California, the remaining  $\frac{5}{12}$ ths being distributed for the remaining portion of the ground so acquired. Now there were two bonanza mines instead of one. Con. Virginia stock sold at \$67 a share and California at \$37, each with 108,000 shares.

The Con. Virginia and the California at once began to sink a new joint shaft at a point 1,040 feet east of the Con. Virginia shaft in order to facilitate the extraction of the bonanza ore bodies and to tap the Lode on its eastward dip at a vertical depth of 2,500 feet. This shaft, which became known as the "C. & C.," eventually supplanted the Con. Virginia shaft as the basis of operations. The hoisting works and surface plant were the largest and best on the Lode at that time. This was the first of the great third-line shafts.

In December 1873 the Con. Virginia shaft reached the 1300-foot level. Drifts were immediately extended south and east into the ore body, which had increased to 300 feet in length and 50 feet in width. The average value had improved to \$50 a ton.

The shaft reached the 1400-foot level in February 1874, and drifts and crosscuts were again sent southward and eastward to the ore bodies, consisting of one similar to that on the 1300 level, with an additional body lying in the north and south zone, but separated from the main body by a large porphyry horse. This ore body was L-shaped, 50 feet wide and 150 feet long. The ore had continued to increase in value with depth and averaged \$54 a ton, mill returns, on the 1400 level.

<sup>31</sup>There was no need to divide the bonanza between two companies. The purpose was to create a new mine for the stock market. The California was operated through the Con. Virginia shaft until the C. & C. shaft supplanted it as a base of operations.

The ore body on the 1200-, 1300-, and 1400-foot levels lay in the northwest rift or shear zone and took that direction, with the exception of the separate body on the 1400 level, which stood near the intersection of the northwest shear zone with the north and south zone. These levels were not directly below one another, as the ore body constantly pitched downward and northward until it joined the main ore body on the 1500-foot level, which stood almost vertically. In the California the ore barely reached upward to the 1400 level. In the Con. Virginia the ore became narrower and poorer above the 1200 level and terminated just above the 1100 level "on a flat roof."

The Con. Virginia declared its first monthly dividend of \$3 a share in May 1874, which was increased to \$10 in March 1875. The California did not commence to declare dividends until a year later. The Crown Point-Belcher bonanza began to decline as the Con. Virginia came into production, and was exhausted in 1876.

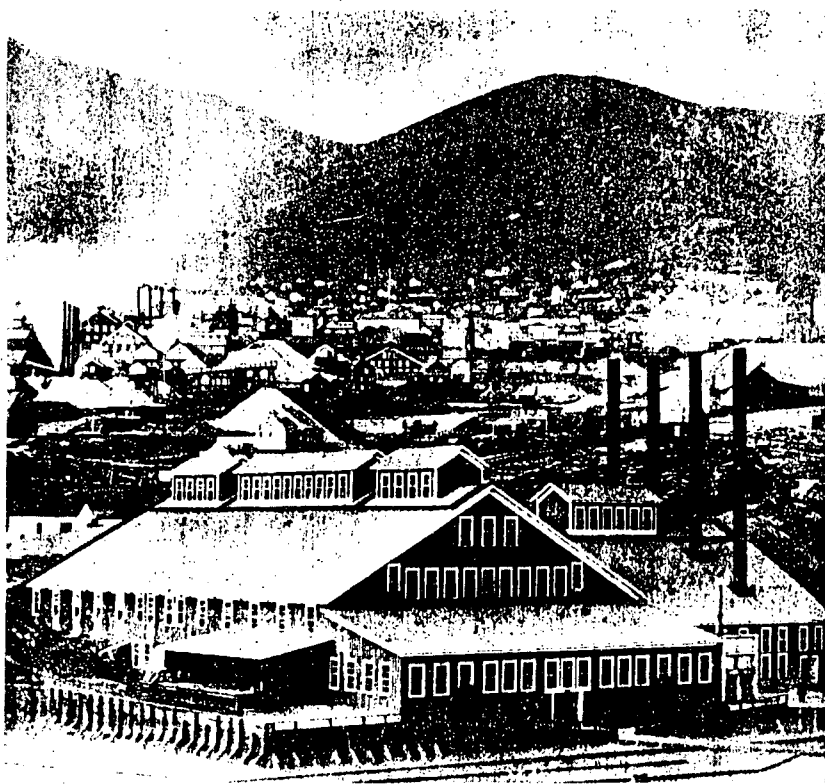
Cyrus W. Field and family and friends, including Charles Kingsley and other notable English visitors, arrived on the Comstock on May 25, 1874. Several of the party visited the lower levels of the Con. Virginia. A three-decker cage, the first on the Lode, was placed in the Con. Virginia in May. Air compressors and machine drills had been installed earlier.

In June 1874 the Firm began the erection of the Con. Virginia 60-stamp mill, which was located just below the mine. It was an elaborate affair with a capacity of 260 tons a day and cost about \$300,000.<sup>32</sup> The mill went into operation in January 1875, but its life was short. It was destroyed in the great fire of October 26, whereupon a similar mill was at once constructed, costing \$350,000. That year the Firm also built the California pan mill, with 80 stamps and a capacity of 360 tons in 24 hours, at an expense of "almost \$500,000," so Lord reported. Fortunately it escaped the fire, with the exception of the stamp mill, which was then located below the Con. Virginia dump. Although called the Con. Virginia and California mills, neither company ever owned a mill of its own; the ore from both mines was reduced under contract at ruling prices in these mills owned by the Firm. The

<sup>32</sup>The mill employed the Washoe process as perfected years before, and differed only in being more perfect mechanically. There were 32 amalgamating pans, each 5½ feet in diameter and holding 3,000 pounds of pulp, and below them 16 settling pans and 8 agitators. W. H. Patton designed and supervised the erection of the mill, which is described in detail in Dan DeQuille's *Big Bonanza*, pp. 336-345 (1876).

local and San Francisco newspapers speak of that as a matter of course: "Mackay, Fair, Flood, and O'Brien have just incorporated their mills under the name of Pacific Mill and Mining Company. Trustees: O'Brien, Flood, Fair, Mackay, and Barron."<sup>33</sup>

In July the Ophir discovered a small body of ore on its 1465-foot level near the north line of the California. The ore was of



CALIFORNIA PAN MILL

Built by the Bonanza Firm in 1875. The crushing plant was located below the C. & C. Shaft and the pulp flumed to the mill. The C. & C. hoisting works shows at the left center; beyond it is the Con. Virginia, with four stacks. The Con. Virginia mill is in the center of the picture, with the Ophir hoisting works and dump at the extreme right showing faintly.

the same character as that in the California and stood in a similar shattered zone, although running more easterly and westerly, which led to the assumption that the bonanza extended through the California and into the Ophir.

<sup>33</sup>Daily Territorial Enterprise, August 14, 1874. This time Dan wrote the name correctly.

Presently the mining experts began to make enthusiastic reports. The stock market, however, failed to respond, which brought complaints from the newspapers: "Stocks appear to grow weaker as developments in the mines multiply and the faith of our mining men in the value of these developments strengthens."<sup>34</sup>

<sup>34</sup>Id., August 1, 1874.

All of the leading mines were sinking their shafts as rapidly as possible. The Savage and Hale & Norcross had reached 2,200 feet and were soon to be baffled by floods of water. The other main shafts averaged 1,700 feet.

### THE LAST WASHOE PROCESS MILL—ELECTRIC POWER

The last Washoe process mill on the Comstock and the first to use electric power was built on the Chollar in 1887 by Capt. J. B. Overton to work low-grade Chollar ore as well as ore from the fine little ore body found on the upper levels of the Hale & Norcross in 1887. The mill, called the Nevada, had 60 stamps, each of 800 pounds, 30 amalgamating pans, 15 settling pans, and 10 agitators, after which the tailings passed over a long line of blanket sluices to catch the escaping amalgam and other values. Each pan held 3,000 pounds of pulp and was charged with 300 pounds of quicksilver and small amounts of salt and sulphate of copper, and sometimes soda or caustic potash.

The power plant of the mill was ingenious, and perhaps the first of its kind; part of it provided by an 11-foot Pelton water wheel at the surface, driven by water under a 460-foot head, brought down from the Water Company's flume. After the water passed the surface wheel it was dropped down the shaft 1,630 feet in two iron pipes to run six small Pelton wheels on the Sutro Tunnel level, which drove six Brush dynamos, each separately, the current being transmitted over copper wires to the dynamos in the mill.<sup>11</sup> Both installations operated successfully as long as the ore lasted. Electric power to operate mines and mills was brought from the power plant on the Truckee River, forty miles away, in 1900. The large mills built in recent years to work low-grade ores have used the cyanide or the flotation process, or both. The Washoe process has passed out of use, and ball mills for pulverizing ore have taken the place of stamps the world over.<sup>12</sup>

### LOSSES IN TAILINGS AND QUICKSILVER

The Comstock mines produced a little over \$300,000,000 from 1859 to 1880, excluding returns from tailings, and it has been said repeatedly that an additional \$100,000,000, or 25 percent, escaped in the tailings and was irretrievably lost. But that estimate appears to be excessive.

The total loss up to 1880 is estimated at \$70,000,000, and could not have exceeded \$75,000,000. The total amount recovered from

<sup>11</sup>Dan DeQuille describes the mill on pp. 74-79 of his *History of the Comstock Lode* (1889).

<sup>12</sup>The two great mills of the '70s were built by the Bonanza Firm to work ores of the Con. Virginia and the California. The Con. Virginia mill had 60 stamps and milled 280 tons in 24 hours. The California mill with 80 stamps reduced 360 tons.

tailings saved up to that time is estimated at \$23,000,000, including some that were reworked later. Hague, in 1870, estimated the average recovery from tailings as \$5.50 a ton. Until the cyanide process was introduced the millmen did not expect to recover more than 50 to 60 percent of the values in the "tailings," or sands and the slimes. Some rich tailings were reworked twice, or even a third time after cyanide came into use.

The total loss in quicksilver is startling. On an average it exceeded one pound for each ton of ore milled up to the present time, or about 14,000,000 pounds. At an average of 60 cents a pound the monetary loss was \$8,400,000. Dan DeQuille estimated the loss at 7,344,000 pounds up to 1876, by assuming too large an average in the earlier years.<sup>13</sup> When he was writing his *Big Bonanza* in 1875 he stated that the loss of quicksilver in milling the rich ores from the Con. Virginia bonanza "amounted to \$60,000 and \$70,000 per month"—a loss of over three pounds for each ton milled. The price at that time exceeded \$1 a pound, the ore averaged \$100 a ton, and they were charging each pan, holding 3,000 pounds of crushed ore, with 300 to 500 pounds of quicksilver. Necessarily, the loss in slimes and quicksilver was heavy. Practically all of this lost silver and gold and quicksilver ran down the cañons into the Carson River, which many have dreamed of as another Pactolus from which great fortunes were to be won. Such an attempt was made many years ago, which resulted in failure. If the material was light enough to be carried down to the river in small streams, the major portion would be carried on indefinitely, particularly by the spring floods.

### TAILINGS REWORKED

The first effort to rework rich slimes and tailings at the Gould & Curry mill in 1864 was not successful, and it was not until 1866, after Louis and Henry Janin and Ira S. Parke had solved the problem that it became the practice to save and work them. Meantime about \$20,000,000 had flowed away and was forever lost. In 1864 the newspapers report the Carson River choked with tailings from the Gold Cañon mills. It became the practice to catch some of the sulphides in the tailings by wide, shallow, blanket-lined flumes set at a gentle grade, after which they were sluiced into reservoirs for retreatment.

<sup>13</sup>Dan DeQuille's *Big Bonanza*, p. 145.

# MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Patent Solicitors.

SAN FRANCISCO, SATURDAY, FEBRUARY 10, 1877.

VOLUME XXIV.  
Number 6.

## Comstock Papers.—No. 16.

**Pan Amalgamation, and What It Led To.**  
The trial of pan amalgamation having proved a success, demonstrating the facility and cheapness with which the Comstock ores could be worked, confidence in the value of the mines was greatly increased, and many parties were encouraged to put up reduction works who would not otherwise have gone into the business. The popular idea that a vast deal of science, or at least much practical skill, was indispensable in the treatment of argentiferous ores having been thus partially dissipated, the California millmen were quite certain that they could deal with them successfully when a method so similar to that employed in reducing the gold-bearing quartz of this State would answer the purpose. Accordingly a good many of this class repaired to Washoe during the summer and fall of 1860, with a view to putting up mills and running them on this new school of ores. The arastras that had been set up the year before were designed merely for working the quartz found at Gold Hill, in which the most of the gold was free and easily separated, no effort having been made to save the silver which it contained; the miners not then suspecting, in fact, that it carried any of this metal. When the sulphureted silver ores of the Comstock proper came to be handled, this style of apparatus was found to be wholly inadequate; hence early recourse to more effectual methods became necessary.

### Era of Active Mill Construction

The completion in August, 1860, and the successful operations of the Paul and the Coover mills, was immediately followed by the inauguration of numerous other enterprises of this kind, several having, in reality, been planned prior to the above date and in anticipation of the success that it was expected would attend these pioneer establishments. So rapidly, indeed, did this business of mill construction thereafter proceed, that no less than 86 works of this description, carrying a total of 1,200 stamps, and costing an aggregate of over six million dollars, had been finished and started up by the end of 1861, some 40 or 50 arastras and several patio yards built and set at work meantime, not being included in this estimate. Work upon a good many other mills had also been commenced before the end of that year, the most of which were completed early in 1862, when the era of most active mill construction terminated in so far as the Comstock mines were concerned, this industry having, for the next three or four years, been transferred to Emerald, Reese river, Pine Grove, Humboldt, and other interior districts.

### Location, Cost and Capacity.

Of the mills built for reducing the Comstock ores eight, carrying 114 stamps and costing \$200,000, were located in Ormsby county; six, carrying 106 stamps, and costing \$1,200,000, were located in Washoe county; forty, carrying 573 stamps, and costing in the aggregate \$3,700,000, were located in Storey county; twenty-two, carrying 360 stamps, and costing \$1,000,000, were located in Lyon county, and ten, carrying 84, and costing \$300,000, were located in Esmeralda county, there having been erected, up to the end of 1861, not more than two or three small establishments of this kind in any other portion of Nevada Territory.

### The First Parties to Put Up Water-Driven Machinery.

East of the Sierra, for the purpose of ore reduction, were Judge James Walsh and his partner, Joseph Woodworth, who, on their first visit to Washoe, in the latter part of June, 1850, threw a slight dam across the Carson river, at a point about one mile above the present town of Dayton, then Chinatown, and, diverting the water into a side race, employed it for propelling a couple of arastras, which they constructed and put up there for testing the Gold Hill ores, they having bought from Comstock a small claim at that point before purchasing the silver bearing deposit a mile further north, and which afterwards constituted the site of the great Washoe discovery. The water right so secured on the river was, the

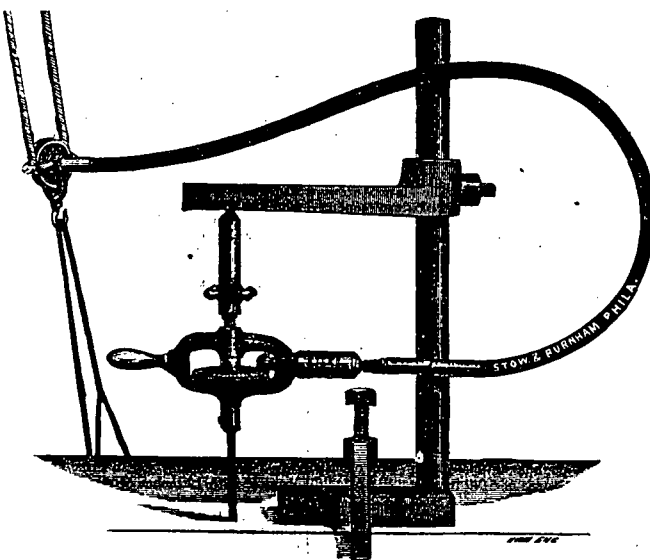
next year, further utilized by the construction there of additional arastras and, finally, by the erection of extensive reduction works, this now being the site of the present Ophir company's large and efficient mill.

Besides Paul, Coover and Harris, the following parties commenced the erection of mills, and, in some cases, completed and had them running before the end of 1860: Richard Ogden and J. Downes Wilson, who, in November, 1860, finished the Ogden & Wilson mill, the first one completed in the Virginia City district; Henry G. Bissel, Alpheus Staples, Israel W. Knox, who built the Olive Branch mill, Flowery district; McNulty, who built what was afterwards known as the Bacon mill; Peter Frothingham, who put up a small establishment on Carson river, four miles below Dayton; John B. Winters, connected with Woodworth & Mosheimer in the building of the Carson River mill; John Atchison, Logan and Holmes, whose works were also on Carson river; Trench & Sparrow; De Land, Eclipse mill; and various other persons, whose names we cannot now recall to memory. Among the mills that were begun this year and completed near the end of it or early in 1861, was that of the Spanish

## Flexible Power Transmitter.

This is a very simple and useful device, as the accompanying illustration will show. It is the first successful application of a flexible shaft for general purposes of transmission of power. The *Polytechnic Review*, during the late exhibition, thus described this piece of mechanism: Passing along the north avenue of machinery hall, our attention was attracted to what appeared to be a section of inch leather hose, with a revolving twist drill for a nozzle, the hose lying quietly on the floor and the drill or nozzle making a clean, smooth hole through a chilled car wheel already perforated several times by the same means.

Following the "hose" backward and around a corner it was seen to terminate in the arbor of a rapidly revolving grooved pulley fastened temporarily to the floor and driven by a braided round leather belt, which after several corner turnings is seen to be driven by a grooved pulley high overhead. The mystery was explained.



THE STOW FLEXIBLE POWER TRANSMITTER.

company, at Virginia City; the Aurora, Keller, Dayton, the Sprout and several other mills on Carson river, besides a number of small establishments along Gold canyon, one or two about Virginia City and several along Six-Mile canyon, in the Flowery district. In the next number of these papers something will be said about the Ophir, Gould & Curry and other extensive works put up in 1861-2 at an enormous expenditure of money, but which, after a few years, ceased operations and were finally dismantled, with some remarks upon the causes that led to these disastrous results.

REAR-ADMIRAL JAMES ALDEN died in this city on Tuesday last. Admiral Alden took part in the Mexican war, and was present at the capture of Vera Cruz and Tobacco. He commanded the *South Carolina* in 1861, the *Rickmond* in 1862, and was at the engagement with Forts St. Philip and Jackson, and at the capture of New Orleans. In 1869 he was made Chief of the Bureau of Navigation.

THE stagnation of certain manufacturing interests is indicated with terrible distinctness at Newark, N. J., where one-seventh of the population is dependent upon public charity.

One hundred and three deaths from small-pox were reported in London last week, the largest number during the present epidemic, except in the first week of January.

The "hose" was the sheath of what is termed a "flexible power transmitter"—a closely laid cable of steel wire which accommodates itself to any flexure, while transmitting unabated the rotation communicated to it (in the direction of its spiral) at the end. This cable has a high torsional but a low bending resistance.

The drill may be thrown in and out of gear in an instant. The power transmitted may be carried around, under or over any obstacle; and by it may be applied, to any angle, a twist or rabbit drill, a tap, die, diamond drill, wood auger, carving and polishing tool, horse clipper, or any other implement requiring rotation and rapid and easy adjustment.

Carried under a heavy casting, or into the manhole of a boiler, or wherever boring, drilling, polishing, etc., is required, the application and guidance by hand is all that is needed. Few more simple and convenient devices have been presented to notice, and each day new applications are presented. Cloth shearing and cutting and the cutting of flue tubes are easily effected by its means. The patentees are Nelson Stow, and the manufacturers are Stow & Burnham, No. 500 North Fifteenth street, Philadelphia.

A CALL has been issued for a meeting of the National Teachers' Association, to be held in Washington on the 1st, 2d and 3d of March. Subjects of interest to the cause of education have been arranged for discussion.

## Whip-Making and the Effects of Steady Employment.

Simple as it appears, a first-class linen-plaited whalebone whip is constructed in an exceedingly interesting and ingenious manner, and it requires careful and honest management to uniformly produce a perfect and durable article. The stock for manufacturing must be judiciously chosen and the liquid or sticking material correctly compounded and applied in proper condition. The American Whip Company, of Westfield, Mass., well known in the trade in all American cities, is undoubtedly the largest factory in the world. In no other establishment is so large a variety of whips made in such perfection and great numbers.

Thirty years ago, says Mr. H. J. Bush (one of the leading founders of this company), a knife and plane were all the tools employed by a journeyman whip-maker. Now, we should judge that \$50,000 would not pay for the improved tools and machinery in this single establishment. The most ingenious in construction and operation is the plating machinery with its dozens of wheels revolving and carrying different strands of thread in an amazing number of different ways, rapidly forming perfect fitting braid to the varying surface of the whip-stock. One of the latest invented machines plate the buttons on the stocks more evenly than, and as perfect as, the human hand.

The American Whip Company occupy a large four-story brick building, employing from 40 to 50 men when in full operation. One hundred and fifty dozen or about 2,000 whips can be turned out daily. Although the largest, this factory is only one of many equally well-deserving factories in the vicinity.

Westfield, for more than a quarter of a century, has been noted as being headquarters for whip and cigar-making in the United States. During the past 10 years the town has, from appearances, doubled in wealth if not in population. The braiding of horsehide and buckskin lashes, snaps, and the working of buttons, etc., on whips taken into the industrious homes of the villagers, has given the town a thriftiness rarely enjoyed of late years by their neighbors in other parts of New England. This exemplifies the great benefit to any community of having some light employment for women and children. Although the remuneration may be very low, such employment tells largely in its general results. Some such employment universal in California would produce a wonderful change in the happiness and prosperity of our people.

THE Centennial mine, Nevada county, has paid its first dividend, aggregating \$3,000. The *Foothill Tidings* says of the mine: When it is remembered that the Centennial is a new mine—that only a few months ago the locators of the mine were going round town soliciting parties to take a little stock in it at nominal or "bed-rock" rates, "just to help it on its feet you know,"—and that it has paid its expenses from the word go, and pays now dividend number one, amounting to more than the whole mine was held at a few months ago, we have a realization of why people will continue to put money into these legitimate mining enterprises, even though they do not all pay out as soon and as well as the Centennial. Some of them do and the average will turn out as well as most commercial ventures, if only good judgment followed by good management, go with the investment.

A USEFUL DEVICE.—We received a curious little arrangement this week from C. H. Barrows, of Williamstown, Connecticut, in the shape of a "moustache protector." It is a device to place on the edge of a cup to keep the moustache out of the tea or coffee, and is much better than the ordinary moustache cup. It is self-adjustable, and by means of spring clamps will fit any cup, tumbler, mug or bowl, and is really a useful thing for moustached gentlemen. It may be carried in the vest pocket, being made of very thin metal, nickel plated. The invention is a new one, and is just being introduced for sale.

(5000.) - J. B. McCullough to Pac. Mill & Mng Co. - (Sept. 8, 1879)

of  
nes  
Lands  
ill

This Agreement, by and between McCullough, of Virginia City, of the first part, and the Pacific Mill and Mining Company, of the second part, made the eighth day of September, A.D. Eighteen hundred and seventy nine, witnesseth: That the said McCullough, for the consideration hereinafter mentioned, has bargained, sold, and delivered possession of, to said Pacific Mill and Mining Company, certain Ore Slimes, or certain parcels of ore slimes which are now situated and lying in Seven Mile Canon - in Virginia City - in Storey County - in the State of Nevada - Easterly from the Land Mill Site - there being one thousand tons - more or less - and being the same slimes which were run from the Land Mill.

And the said Pacific Mill and Mining Co., in consideration thereof, pays to said McCullough in hand the sum of one hundred dollars (\$100), the receipt whereof is hereby acknowledged by said McCullough, and will pay to said McCullough on demand on the sixth (6<sup>th</sup>) day of October next, the further sum of Forty nine hundred dollars (\$4900.) in United States Coin - making five thousand dollars as the total sum of money for which said slimes are bought.

In witness whereof, the parties to these presents have hereunto set their hands and seals, the day and year first above written.

(Signed) J. B. McCullough {L.S.}  
" D. B. Lyman, Supt {L.S.}

A-10691

UNITED STATES GEOLOGICAL SURVEY  
CLARENCE KING DIRECTOR

---

COMSTOCK

MINING AND MINERS

By ELIOT LORD



WASHINGTON  
GOVERNMENT PRINTING OFFICE  
1883

In the spring of 1862 the snow on the slopes of Mount Davidson began to melt rapidly. The ground which covered the shallow mine-workings at Gold Hill was washed away by the descending floods and softened by percolating streams. When the earth ceased to be self-supporting the few timbers which propped the roof and walls of the excavations gave way, and many mines were effectually closed.<sup>1</sup> Even in midsummer a number of these mines had not been reopened, though some were partially cleared of débris. The industry of the district received a serious check, but this grave warning was not sufficient. On the morning of July 15, 1863, a startling crash was heard at the other end of the lode, when half of the Mexican Mine, from the surface to the depth of 225 feet, caved in with an irresistible momentum which bore the ponderous mass of crumbling rock and splintered wood past the limits of the mine into the workings of the Ophir Company.<sup>2</sup> Fifty feet of the fourth gallery or level in the Ophir Mine was at once obliterated, and large portions of the second and third galleries soon gave way before the accumulating pressure. An acre of surface was crushed open as if a blast had exploded beneath;<sup>3</sup> the unsupported roof sunk down; the main shaft on the south line of the Mexican Mine closed up, and part of the engine-house was undermined and destroyed. "The whole mine," wrote an admiring eye-witness, was "a lovely chaos."<sup>4</sup> Caves like this do not occur without a previous warning. A gradual settling of the ground had been going on for a number of days; props were thrown out of place and cap-timbers broken; the sharp cracking of overstrained pillars and dull rumbling noises of shifting ground could be plainly heard; still the superintendent remained blind and deaf; weak supports were not braced and sinking roofs were not upheld. At length his underground house came down upon his head and nearly crushed him in its fall. Twenty workmen were in the mine when the roofs of the galleries began to close upon them; headed by the superintendent they rushed toward the incline leading up out of the mine. A mass of crumbling rock fell near them, forcing the air through the drift in a sudden blast, which blew out their candles; the sound of splintering timbers and cracking rock filled their

<sup>1</sup> San Francisco Evening Bulletin, July 17, 1862.

<sup>2</sup> Territorial Enterprise, July 16, 17, 1863.

<sup>3</sup> Mining and Scientific Press, July 27, 1863.

<sup>4</sup> Territorial Enterprise, July 17, 1863.

ears. In single file they groped their way up the narrow stairs, crouching and crawling in the darkness through the closing passage which led to the light. After a short but frightful climb they reached the surface and knew what it was to breathe freely, having escaped from an earth-monster's grip far more tenacious than the clutch of the devil-fish. The superintendent scarcely deserved his good fortune. His mine was a wreck and twenty stout men nearly lost their lives through his negligence or incapacity. Under the old Roman Empire, when life and property were guarded as valuable, he would not have escaped judgment, as by the laws of Theodosius and Valentinian those who culpably occasioned loss of life and property by the falling in of a pit or mine were condemned to death, because they had set themselves up as professors of an art they did not understand.<sup>1</sup> In this buoyant, careless-tempered mining district, however, such professors were only laughed at.

Twenty months later another great cave rent the surface of Gold Hill (March 5, 1865), filling the upper levels of the Imperial, Empire, and Eclipse mines, and breaking up the ground between the Empire and Eclipse hoisting-works so violently that the engines were thrown out of place.<sup>2</sup> The first level of the Imperial Mine was entirely closed, the supporting timbers being crushed like egg-shells, and so great was the concussion of the atmosphere when the vast body of earth settled, as it did with one mighty crash, that fragments of rock were thrown more than 300 feet up the Imperial shaft, against the roof of the hoisting-works, with such force that they were instantly powdered and filled the room with a cloud of dust. The shafts of the Eclipse and Empire mines were so warped that the men on the lower levels could not be hoisted out, but made their way to the shaft of the Imperial Company and were then raised to the surface. This was a startling experience, but as the ground had, fortunately, refrained from falling in until the upper levels were exhausted of their ore-contents and no person was killed by its fall, the superintendents agreed in looking upon the cave as a permanent benefit. This cheerful view of the situation was characteristic of the time and

<sup>1</sup> Gambos's Commentaries, Heathfield's Translation, vol. 1, p. 336.

<sup>2</sup> Gold Hill News, March 6, 1865.

place. "Nobody's hurt and who cares," might have been adopted as a fitting motto by these happy-go-lucky miners.

Yet the most reckless of them could not always regard these accidents with indifference. When men were crushed and buried under masses of rock and splintered timbers no one could smile. Instant death was here a mercy to the victims. The mangled bodies of men who died like Opie<sup>1</sup> and Sullivan<sup>2</sup> were less piteous to see than the prolonged torture of one like Patrick Price, who was buried alive by a cave in the Chollar-Potosi Mine, October 5, 1867. He was at work near the bottom of an incline when the ground about him suddenly gave way, owing to the insufficient timbering of a lower level, and he was caught and carried down several feet by falling timbers and rock. The mass above pressed heavily upon him, and he could not move hand or foot, but his head was in some way protected and he was able to call with a strong voice for help. His fellow-miners answered the call, but the walls of the incline were cracking and settling so fast that none dared to venture within twenty feet of the buried man. For more than an hour they watched the ground slowly closing above his head, but forced themselves to speak cheerily that he might not suffer the anguish of despair also. Once they set fire to a ball of oakum saturated with coal-oil and rolled it down toward him. "I see the light," he cried, joyfully. "I am glad you're coming for me, boys!" At this cry a desperate attempt was made to place a rope about his body but in vain. The loose earth was falling about his face, and his voice could scarcely be heard. He had borne his lingering torture bravely, but at length one moaning cry passed his lips. It was his last. In a few moments a great mass of clay, rocks, and timbers slid down upon him and his suffering was ended.<sup>3</sup> It would seem that the recovery of a body, merely to lay it in a shallower grave was an uncalled-for service to the dead, but miners are very reluctant to leave a corpse in a mine where they are working. Several attempts were, therefore, made at different times to find the body of Price, but without success, until the 27th of May, 1869, when the disfigured remains of the poor miner, half eaten

<sup>1</sup> Virginia City Territorial Enterprise, July 10, 1866.

<sup>2</sup> *Ibid.*, October 16, 1866.

<sup>3</sup> Sacramento Union, October 8, 1867; Gold Hill News, October 7, 1867.

by rats, were uncovered.<sup>1</sup> A simple head-board stands in the Catholic grave-yard to record his death and to declare without words the criminal carelessness or ignorance of the men who failed to timber and support a mine-level properly.

Accidents may of course occur from rock falls while men are at work for which mine owners are not justly blamable. In spite of repeated warnings miners are often careless and lose their lives in consequence of their rashness; or, again, when every precaution apparently is taken, some unforeseen chance may prove the best judgment to be in error, and the usual coroner's verdict, "No one to blame," may then be just. In later years, warned by experience, superintendents have used all due care to protect their workmen, and probably no mines in the world are now more securely timbered than those on the Comstock Lode; but the fatal results of the early neglect should be remembered forever by American miners. Opie, Sullivan, Price, Brightmore,<sup>2</sup> White,<sup>2</sup> Dougherty,<sup>3</sup> Kennedy,<sup>3</sup> Hanson,<sup>3</sup> and others form a ghastly company who, though dead, bear witness as no living men can to the necessity of experience, skill, and care in the development of our mines. The men who refused to split Hanson's head open with an ax to end his misery will not forget the cause of his death;<sup>4</sup> but it is to be feared that some who have not seen strong men crushed into bleeding pulp before their eyes may be heedless of all other warnings.<sup>5</sup>

While these caves were rending the face of the ground and burying men in the mine-depths work along the line of the lode was rapidly pushed. American miners may sometimes be reckless, but they have never been accused of being dilatory. As the shafts grew deeper the simple windlass, by which a bucketful of water, rock, or ore was raised to the surface, was replaced by whims turned by horse-power and by small steam-hoisting engines. In 1860 the Ophir Company had first raised ore with steam-

---

<sup>1</sup> Gold Hill News, May 31, 1869.

<sup>2</sup> *Ibid.*, January 3, 4, 1870.

<sup>3</sup> *Ibid.*, June 29, 31, 1870; San Francisco Bulletin, June 29, 30, 1870.

<sup>4</sup> *Ibid.*, June 29, 31, 1870.

<sup>5</sup> The fatal accident at the Golden Terra Mine, near Central City, Dakota, in May, 1880, emphasizes this conclusion; for several of a working shift were killed and the remainder were only rescued by extraordinary exertions after an imprisonment of nineteen hours.—(Associated Press dispatches, May 20, 1880.)

nds in the Catholic  
t words the criminal  
lumber and support a

s while men are at  
nable. In spite of  
e their lives in con-  
ecaution apparently  
t judgment to be in  
e, may then be just.  
s have used all due  
s in the world are  
lock Lode; but the  
d forever by Amer-  
White,<sup>2</sup> Dougherty,<sup>3</sup>  
y who, though dead,  
of experience, skill,  
men who refused to  
sery will not forget  
ome o have not  
their eyes may be

nd and burying men  
as rapidly pushed.  
y have never been  
ne simple windlass,  
to the surface, was  
all steam-hoisting  
ed ore with steam-

power by means of a rope wound round the shaft of their pumping-engine,<sup>1</sup> thus pulling a car filled with rock up the incline which they had sunk on the dip of their ledge; yet, in the spring of 1864, they were working with a large new whim operated by horse-power. One horse turned the whim easily, hoisting a bucket 50 feet with every revolution of the drum.<sup>2</sup> The Sunrise Company in the spring of 1864, were building a whim in place of their former windlass on the score of greater cheapness and rapidity of working.<sup>3</sup> The cost of operating a windlass by two men during three shifts of eight hours each was stated to be \$24, while two drivers and two horses would hoist out the same quantity of rock by means of a whim at a total daily expense of \$12.

During the first two years of work on the lode only a few companies had the mouths of their shafts covered by buildings, but at the close of 1862 not less than forty companies had erected houses of some sort over their shafts, and twelve, at least, had machinery driven by steam for pumping water or hoisting rock from their mines.<sup>4</sup> Viewed from the mountain summit above the line of the shafts the dingy heaps of rock and sand near the mouth of every pit and tunnel appeared like ant-hills rising imperceptibly from day to day. Some hills were comparatively deserted, but all day long a moving swarm of men, oxen, horses, and mules clustered about the dumps of the chief ore-producing mines, the Ophir, Mexican, California, Gould & Curry, Chollar, Potosi, and the small Gold Hill claims.<sup>5</sup> Here the ore of different grades was assorted, screened, and shoveled into sacks or thrown into carts. Moving trains wound in and out through the surrounding streets, sometimes caught fast for a moment in a confused jam, and then escaping from its meshes with a parting salute of curses and whip-crackings.<sup>6</sup> Below the surface the little army of miners was steadily burrowing its way through the heart of the ledge, cutting a few feet daily with picks and drills, one shift succeeded by another, descending and ascending the shafts in swaying buckets dangling at the end of elastic ropes; or, as in the Ophir Mine, mounting the incline by a steep narrow

<sup>1</sup> San Francisco Evening Bulletin, December 13, 1860.

<sup>2</sup> Gold Hill News, April 21, 1864.

<sup>3</sup> Gold Hill News, April 22, 1864.

<sup>4</sup> Virginia City Union, December 20, 1862.

<sup>5</sup> Sacramento Union, December 12, 1862.

<sup>6</sup> Virginia City Territorial Enterprise, August 26, 1862.

May, 1880, emphasizes this  
rescued by extraordinary  
ay 20, 1880.)

flight of steps 400 feet in length, bearing flickering candles in a rational torchlight procession.<sup>1</sup>

North of the Ophir Mine, beyond the dwelling-houses of the city, on the south side of Cedar Hill, as the peak next to Mount Davidson was called, three companies were at work, in the spring of 1862, washing away the hill-side soil of red loam and broken quartz with hydraulic streams. The Cedar Hill Float Rock and Surface Mining Company, the first to begin work, had a stream of only 50 feet head, but the Cedar Hill Float Rock and Mining Company No. 2 and the Virginia City Hydraulic Mining Company had constructed a large reservoir fully 600 feet above their placers, which was filled by means of a ditch cut from Spanish Ravine, and the water from it conveyed through a flume to the desired point for use. The supply was not large, but the fall was so great that the stream cut its way rapidly into the bank, "thrashing boulders about like pebbles."<sup>2</sup>

This hydraulic or surface mining was merely an incidental accompaniment of the great task of exploring the depths of the lode. As the unruly, boisterous mining camp began to yield to the control of civilizing and restraining influences, so from the discordant and unsystematic operations underground a consistent and uniform scheme of lode-development was gradually evolving. Shafts and drifts were cut with some reference to the lines followed in adjacent mines; connections were established systematically between adjoining galleries on the same level, and currents of fresh air were made to flow from shaft to shaft, changing and purifying constantly the vitiated atmosphere of the working levels. The old line of works was generally abandoned, and operations were carried on through a new line of substantially constructed vertical shafts several hundred yards to the east of the lode croppings and consequently nearer the base of Mount Davidson. These shafts were divided into three or four compartments, the Curtis Shaft of the Savage Mining Company being an example of the better class. This contained a pump compartment 5 by 6 feet, two "hoisting" compartments for the ordinary mine work, and one "sinking" compartment, by which the shaft was excavated, equal in size to

<sup>1</sup> Territorial Enterprise, April 22, 1863.

<sup>2</sup> San Francisco Evening Bulletin, April 25, June 20, 1862; Virginia City Territorial Enterprise, May 22, June 13, 1862.

ndles in a rational  
 ses of the city, on  
 unt Davidson was  
 362, washing away  
 hydraulic streams.  
 pany, the first to  
 e Cedar Hill Float  
 Hydraulic Mining  
 feet above their  
 Spanish Ravine,  
 desired point for  
 at that the stream  
 out like pebbles."<sup>2</sup>  
 incidental accom-  
 the lode. As the  
 ntrol of civilizing  
 nsystematic oper-  
 lode-development  
 h: reference  
 were established  
 vel, and currents  
 ng and purifying  
 s. The old line  
 rried on through  
 several hundred  
 nearer the base  
 ree or four com-  
 pany being an  
 apartment 5 by 6  
 e work, and one  
 , equal in size to

the pump compartment.<sup>1</sup> The first row of shafts had been lined with planks only three inches in thickness, but the rock sides of the new shafts were held in place by successive sets of timbers 12 inches square, supported by posts 4 feet in length.<sup>2</sup> At different points on the line of a shaft, generally 100 feet apart, openings were made into chambers with a floor surface of 100 square feet or more, called stations, where various mine supplies were stored, and from these stations galleries, known technically as cross-cuts, were extended toward the west at different levels through the barren country rock until they reached the hanging wall of the lode, or some sheet of clay, which was usually considered its eastern boundary plane. When this clay wall was fairly pierced, the cut was prolonged, at the discretion of the mine superintendent, either partly or entirely across the lode, meeting in the latter case the western or foot wall, a well-defined boundary plane of diorite ordinarily. From this cross-cut galleries, known as drifts, were extended through the lode lengthwise or in a direction approximately north and south, and cross-cuts from these galleries at varying or regular intervals explored the lode more or less thoroughly and determined the existence of ore-bodies in the gangue. Winzes, or galleries cut at different angles from one level to another, completed the scheme of exploration and secured more perfect ventilation throughout the mine. Main working drifts were six feet high in the clear, from 3½ to 4 feet wide at the top and somewhat more at the bottom, supported when necessary by timbers from 8 to 12 inches square. Temporary prospecting drifts and winzes were, however, much smaller, and generally left untimbered if practicable.<sup>3</sup> When a shaft reached the hanging wall of the ledge, which it was constantly approaching, as a perpendicular projected from a base line approaches a hypotenuse drawn at an angle of 45° from the same base, its course was commonly changed to conform with the dip of the ledge, and it was thereafter known as an incline. This incline might be continued indefinitely, or a new shaft cut from a point still farther to the eastward and the same plan of exploration adopted. Cross-cuts and drifts were extended from the incline levels as

<sup>1</sup> Annual Report, Savage Mining Company, 1866, p. 14.

<sup>2</sup> Report of United States Mining Commissioner, J. Ross Browne, 1867, p. 344.

*Ibid.*, p. 345.

from the shaft and the method of ore extraction was the same. Against the disadvantages of hoisting ore around the angle formed by the shaft and incline was balanced the expense of constructing a new shaft and of excavating cross-cuts to the hanging wall. The character of the rock through which the incline must needs pass, and the comparative perfection of the ventilation, generally decided the question in favor of the vertical shaft.

As steam-power hoisting-engines gradually replaced the windlass and whim, iron-frame cages from 4½ to 6 feet high were used instead of the clumsy iron-bound bucket or skip.<sup>1</sup> Wooden guide-rails on the sides of the shaft-compartments regulated the motion through the shaft, and loads were raised and lowered which could not be placed safely in the swaying, dangling bucket. Round iron-wire ropes were substituted in some mines for hemp cables, but with indifferent success, owing to the poor quality of the material and the faulty design of the reel.<sup>2</sup> In September, 1863, the first flat iron-wire rope was made by A. S. Hallidie & Co., of San Francisco, for the Sierra Nevada Mine. It was woven in two coils, each 700 feet long, and was 4 inches in breadth by ½ inch in thickness.<sup>3</sup> It was warranted to raise 10 tons, and was an important improvement upon the ropes in ordinary use, as it was less liable to slip on the barrel of the reel and a cage could thus be lowered more steadily. Cables of similar design, but made of braided steel wire, were adopted later by the Savage, Hale & Norcross and a majority of the other mines on the lode.<sup>4</sup> Small sheet-iron cars were loaded with ore or waste rock at the slopes and pushed over wooden tracks shod with iron on the floors of the mine galleries to the stations at the different shaft levels, where the cage received and raised them successively to the surface. The average weight of a car load of ore was 1,400 pounds,<sup>5</sup> and as the cages in common use until 1871 had only one compartment it was necessary to raise the cars singly.<sup>6</sup> The average speed of hoisting was 700 feet per minute,<sup>7</sup>

<sup>1</sup> Gold Hill News, April 23, 1864.

<sup>2</sup> Andrew Fraser, Virginia City, Nevada.

<sup>3</sup> A. S. Hallidie, San Francisco, Cal.; Territorial Enterprise, September 13, 1863; January 1, 1864.

<sup>4</sup> Gold Hill News, December 19, 1867.

<sup>5</sup> Report of United States Commissioner of Mines and Mining, 1867, p. 345.

<sup>6</sup> Gold Hill News, May 24, 1871.

<sup>7</sup> United States Geological Exploration of Fortieth Parallel, vol. III, Mining Industry, p. 141.

The Confidence, Challenge, Empire and Imperial mines on the site of the original Little Gold Hill discoveries.

## SIX YEARS OF PROGRESS.

225

and 400 tons in a day of twenty-four hours was esteemed an extraordinary amount to extract and raise to the surface through one shaft. This was done by three shifts of miners, working eight hours severally, under the direction of foremen or "shift bosses." In earlier years the working time had often been extended to ten hours, particularly by the smaller companies and individual owners; but in 1866 eight hours' work had become a uniform requirement throughout the district. By the spring of this year, also, the mines had fairly assumed the appearance of a connected system, developed continuously; and it is of interest to compare their respective work and product:

GOLD HILL MINES.<sup>1</sup>

Name of Mine.	Number of men employed during February, 1866.	Number of tons ore raised daily.
Bullion .....	23	
Exchequer .....	20	
Alpha .....	50	75
Imperial .....	75	150
Bacon .....	30	75
Empire .....	49	65
Eclipse .....	27	40
Stevenson .....	27	20
Consolidated .....	38	100
Ploda .....	16	60
Challenge .....	48	50
Confidence .....	41	55
Burke & Hamilton .....	9	10
Yellow Jacket .....	180	175
Kentuck .....	11	10
Crown Point .....	75	75
	724	960

VIRGINIA CITY MINES.<sup>1</sup>

Name of Mine.	Number of men employed during February, 1866.	Number of tons ore raised daily.
Ophir .....	45	30
California .....	6	10
Gould & Curry .....	245	215
Savage .....	176	90
Hale & Norcross .....	30	40
Chollar-Potosi .....	160	90
	662	475

15 H C

<sup>1</sup> Mining and Scientific Press, March 3, 1866; from Gold Hill News.

The total amount of ore taken out in Virginia City and Gold Hill daily, according to this statement, was 1,435 tons, which at an average milling value of \$28 per ton would yield \$40,180. The monthly yield at this rate would be \$1,205,400, which was a close approximation to the actual product; for the yield of the lode during 1866 was reported by the United States Commissioner of Mines and Mining to be \$14,167,071.55—a substantial verification of the record in the Gold Hill News.<sup>1</sup> This bullion product was nearly as great as that of any previous year, though the assay value of the ore extracted had steadily diminished since 1860, and if the cost of extraction and reduction had not been cut down correspondingly work in a number of the mines would have been carried on at a loss. The rich sulphurets of the Ophir and Mexican mines, yielding \$3,000 to the ton, had been soon exhausted, and the bonanza of the Gould & Curry Company, the milling value of whose ore in 1862 was \$104.50 per ton, furnished ore in 1866 of only one-third of this value (\$36.90 per ton);<sup>2</sup> but while the cost of extraction in 1862 was fully \$12 per ton and of reduction \$44.48 per ton, these items had fallen in 1866 to \$7.86 per ton and \$13.57 per ton respectively,<sup>3</sup> for the miners in the service of the Gould & Curry Company were extracting  $1\frac{13}{100}$  tons of ore daily to the man

<sup>1</sup> Report of United States Commissioner, J. Ross Browne, 1867, p. 369.

<sup>2</sup> Report of United States Commissioner of Mines and Mining, 1866, pp. 78, 80.

<sup>3</sup> [Third Annual Report, Gould & Curry Silver Mining Company.]

Number of tons ore extracted during 1862, in round numbers, 9,000.

COST OF EXTRACTION, 1862.

Lumber and timber at mine .....	\$26,149 57
Labor and salaries .....	53,405 07
Materials for mine .....	7,307 17
Expenses at mine .....	10,478 85
Freight for mine .....	13,925 77
Cost of extracting 9,000 tons .....	111,266 43, or

\$12.36 + per ton, without deducting cost of prospecting and dead-work.

COST OF REDUCTION, 1862.

Number of tons reduced from December 16, 1861, to December 1, 1862, 8,427.

Materials for process .....	\$42,282 22
Quicksilver .....	7,679 84
Working ores .....	324,889 39
Cost of reducing 8,427 tons .....	374,951 45, or

\$44.48 + per ton.

[Seventh Annual Report, Gould & Curry Silver Mining Company, p. 30.]

Cost of extraction, 1866 .....	Per ton. \$7 86
Cost of reduction, 1866 .....	13 57

(Cost of reduction, Gould & Curry Mill, 1866, \$12.27 per ton; in custom mills, \$15.67 per ton; average cost of reduction, \$13.57 per ton.)

nia City and Gold Hill which at an average mill-  
the monthly yield at this  
proximation to the actual  
s reported by the United  
\$14,167,071.55—a sub-  
ill News.<sup>1</sup> This bullion  
s year, though the assay  
d since 1860, and if the  
t down correspondingly  
en carried on at a loss.  
ines, yielding \$3,000 to  
a of the Gould & Curry  
2 was \$104.50 per ton,  
alue (\$36.90 per ton);<sup>2</sup>  
ully \$12 per ton and of  
n 1866 to \$7.86 per ton  
s in the service of the  
of ore daily to the man

p. 73, 80.

umbers, 9,000.

.....	\$26,149 57
.....	53,405 07
.....	7,307 17
.....	10,478 85
.....	13,925 77
.....	111,266 43, or
.....	and dead-work.

ber 1, 1862, 8,427.

.....	\$42,282 22
.....	7,679 84
.....	324,889 39
.....	374,951 45, or

.30.]

	Per ton.
.....	\$7 86
.....	13 57

tom mills, \$15.67 per ton; average

by the aid of two hoisting-engines and other mechanical appliances. The ore-body, it is true, was easily quarried and the depth of profitable working did not exceed 300 feet (though the shaft was sunk to the depth of 722 feet and several stations opened);<sup>1</sup> but the record is nevertheless a remarkable one contrasted with the results obtained in the mines of other districts, for many of the miners were engaged in prospecting the lode. In the same year the United States Commissioner of Mines and Mining reported that 20 men in the Comstock Mines could accomplish as much as 100 in the mines of Mexico,<sup>2</sup> and this is perhaps not an exaggerated estimate. Thus the high cost of labor was offset by energy, skill, and machinery, and the relative cost of production was, perhaps, in favor of the Comstock Mines. The cost of reduction was still disproportionate and excessive, yet no slight progress was shown in the efficiency and cheapness of the milling process, for the cost had been diminished at least one-half and the percentage of bullion extracted had increased fully one-fourth.

The 46 mining companies working on the lode in 1866 had 44 engines in place for hoisting and pumping,<sup>3</sup> and in the autumn of the same year 62 mills, by careful count, were employed in reducing ore from the mines, running 1,271 stamps and 919 pans, which crushed and amalgamated 57,112 tons of ore monthly.<sup>4</sup> During the six years following the discovery of the lode (1860-'65 inclusive) about 28 miles of tunnels and drifts had been excavated and about 5½ miles of shafts, winzes, and inclines, exclusive of stopes and ore-chimneys, entailing fully as much work, giving a total of 57½ miles, according to the estimate of the State Surveyor General.<sup>5</sup> Certainly such an exhibit is a record of mining enterprise and energy which, considering the drawbacks of inexperience and locality, stands without a parallel.

Yet the progress made in the development of the Comstock Lode mines during these years was not the only result of the discovery nor the most important one; for, incited by the rewards of the new industry and the hope of similar bonanzas, swarms of prospectors set out from this

<sup>1</sup> Seventh Annual Report Gould & Curry Mining Company, December 17, 1876.

<sup>2</sup> Report of United States Commissioner, 1866, p. 72.

<sup>3</sup> Report of State Surveyor General, 1865.

<sup>4</sup> Mining and Scientific Press, September 29, 1866.

<sup>5</sup> Report of S. H. Mariette, Surveyor General, for 1865.

district as a centre to search for ledges in every direction. The bounding circle of their exploration constantly expanded, and newly organized districts extended like the rays of a star from its nucleus. When one of these outlying districts promised unusually rich returns, like the Reese River region in the spring of 1863, a rush followed which made it teem with prospectors for a few months, and then it in turn served as a base of supplies and was encircled by outlying camps. Sometimes the rush was rewarded by actual prizes, but commonly the movement and dispersion were rocket-like—a prolonged whir, a gleaming beacon, a moment of splendor as the centre of radiant stars, and then dwindling specks of faded glory succeeded by gloom and utter extinction. The Reese River district, or the Toiyabe range, was not such a treasure-trove as its explorers fancied—"a chain 200 miles in length, nearly every mile of which is rich as never hill or mountain was rich before;"<sup>1</sup> still the rush toward it was not wholly unrewarded. From Austin, in the heart of the range, districts radiated like the spokes of a wheel; southwest lay Lone, Union, and Mammoth; west, Augusta and Cold Spring; northwest, Ravenswood; northeast, Cortez; southeast, Jefferson and others; east, Mountain, Eureka, Diamond, and Gold Cañon, chief among scores of others then notable, now nameless and forgotten.<sup>2</sup>

In this way Nevada was explored; nor was the quest limited by the confines of the Territory. From California and the older States of the Mississippi Valley venturesome prospectors crossed and recrossed the intervening tract of deserts and mountain ranges in the Great Basin. Before the discovery of the Comstock Lode their efforts had been mainly directed toward the discovery of gold placers; but incited by the reported yield of the quartz mines in California and Nevada, the mountain ranges were searched for ledges no less diligently than the ravines were scoured for gold dust. In the basin east of Nevada the search was not well rewarded. Some developments were made in the Rush Valley district in Utah and smelting-works were erected, but the process failed to extract the precious metals satisfactorily, and owing to the expense of production

<sup>1</sup> Reese River Reveille, in Territorial Enterprise, October 7, 1864.

<sup>2</sup> *Ibid.*

rection. The bounding and newly organized dis-nucleus. When one of returns, like the Reese ed which made it seem turn served as a base Sometimes the rush movement and dis- gleaming beacon, a s, and then dwindling utter extinction. The such a treasure-trove ght, nearly every mile before;"<sup>1</sup> still the rush in, in the heart of the ; southwest lay Ione, d Spring; northwest, son and others; east, hief among scores of

quest limited by the e older States of the ed and recrossed the in the Great Basin. orts had been mainly cited by the reported the mountain ranges ravines were scoured search was not well ash Valley district in ess failed to extract xpense of production

the work was unprofitable.<sup>1</sup> North of the Nevada boundary line better results were attained. In Montana the first rude quartz-mill was erected in the Bannock district during the winter of 1862-'63. Its iron work was fashioned in a blacksmith shop from the wrecks of old wagons, and much of the wood-work was obtained from the same source; yet it reduced the rich ore of the Dakota Lode with considerable profit, wherein it outdid the early workings of the more pretentious steam stamp-mills erected in 1864.<sup>2</sup> The quartz veins of Owyhee and Alturas districts in Idaho began to attract attention in 1864, and productive mines were then first opened in that Territory.<sup>3</sup> South of Nevada districts were organized in 1862, along the valley of the Colorado River, and the mines of central Arizona were opened in 1863.<sup>4</sup>

On the western slopes of the Rocky Mountains the influence of the Nevada silver discoveries was no less noticeable in the stimulus thereby given to the search for deposits of the precious metals. Gold placer discoveries attracted a swarm of prospectors to Colorado in 1859, as many parts of the Territory had been explored by gold hunters during the previous year. On the 6th of May, 1859, the Gregory Lode, in Gilpin County, was located and the foundation thus laid for the towns of Central City and Black Hawk.<sup>5</sup> Seven years later the richness of the great silver-ledge belt on the western slope of the Rocky Mountain range was made known generally by the display at the Paris Exhibition of masses of silver ore from the Argentine and Griffith districts in Clear Creek County, and the search for silver-bearing quartz ledges was renewed with fresh energy and richly rewarded.<sup>6</sup>

The knowledge of the mineral riches of New Mexico was obtained rather from desultory observation than systematic working, but sufficient information was furnished to warrant a strongly-worded report from Commissioner Taylor in May, 1868, commending the ledge developments to the attention of capitalists.<sup>7</sup>

<sup>1</sup> Report of United States Commissioner, J. Ross Browne, 1867, p. 484.

<sup>2</sup> *Ibid.*, p. 498.

<sup>3</sup> *Ibid.*, 1866, p. 36.

<sup>4</sup> *Ibid.*, 1867, pp. 452-466.

<sup>5</sup> Report of T. W. Noyes, Special Agent, 10th Census, 1880.

<sup>6</sup> Report of United States Commissioner, James W. Taylor, 1867, p. 9.

<sup>7</sup> *Ibid.*, pp. 4, 5.

A008402

---

BIENNIAL REPORT  
OF THE  
STATE MINERALOGIST  
OF THE  
STATE OF NEVADA,  
FOR  
THE YEARS 1873 AND 1874.

---

STATEMENT OF SUPPLIES ON HAND AT CONSOLIDATED VIRGINIA MINE, JANUARY FIRST, EIGHTEEN HUNDRED AND SEVENTY-FIVE.

	Amount.	Value.	Totals.
Timber, feet.....	3,063,292	\$67,392 42	
Wood, cords.....	3391	3,898 50	
Charcoal, bushels.....	1,000	325 00	
Lagging, pieces.....	1,200	180 00	
Powder, pounds.....	200	150 00	
Candles, boxes.....	800	3,040 00	
Hardware, miscellaneous.....		1,000 00	
Shovels, dozens.....	40	360 00	
Picks, dozens.....	40	500 00	
Drills, dozens.....	30	600 00	
Iron, pounds (square).....	4,000	280 00	
Iron, pounds (round).....	2,000	140 00	
Steel, pounds.....	1,000	190 00	
Gas pipe, feet.....	500	40 00	
Lard oil, gallons.....	20	30 00	
Coal oil, gallons.....	30	15 00	
			\$78,140 92
<i>Assay department.</i>			
Crucibles.....		\$500 00	
Litharge, pounds.....	500	60 00	
Borax, pounds.....	100	15 00	
Bone ash, pounds.....	500	30 00	
Nitric acid, pounds.....	70	31 50	
Soda, bicarbonate, pounds.....	200	14 00	
Charcoal, bushels.....	1,000	325 00	
Coke, bushels.....	100	40 00	
			1,015 50
Grand total.....			\$79,156 42

## SIERRA NEVADA.

Considerable improvement has been made in this mine within the past two years; new and excellent machinery has been added, the capacity of which is sufficient to pump the large body of water out. A zinc pipe has been laid from the large tanks on Cedar Hill to a point near the mill, where it branches out into smaller pipes, leading to various parts of the works. Hydrants have also been set up as a guard against fire. Operations have been resumed at the "Old Sacramento Chimney," where some very fine ore was found. A good ore development has been made in the north drift from the old tunnel. The mill is kept busily engaged on ore principally from the old upper workings. A fine body of ore, assaying from fifty dollars to eighty dollars per ton, has been found in a drift run north from the end of the old Sierra Nevada tunnel.

"The old Sierra Nevada shaft—that in the wing of their building in which is their mill—will be pumped out, and sunk to a depth of eight hundred feet (it is now seven hundred feet deep), at which point a drift will be run to cut and explore the deposit. The drift should reach the ore body in going a distance of about three hundred feet. Besides this enterprise, the company have decided to start an incline from this shaft at a depth of eight hundred feet—its contemplated bottom—to follow the dip of the vein eastward. As soon as possible, new machinery of the finest and most powerful description will be set up at this point, so that in a short time the company will have two first-class shafts in full operation, with machinery and apparatus of all kinds to match. The shaft at the old works, in which sinking is thus about to be resumed, is in good order. All that will be required will be the retimbering of about thirty feet at its bottom."

## SILVER HILL.

In the north drift on the third level, considerable white quartz was encountered, with occasional spots of good ore; also, a few small vents of ruby ore. There is considerable improvement in the quality of the rock in the northeast drift on this level, and it continues improving as the drift advances. The south drift on the second station level is being rapidly advanced in quartz of a promising character, and it is confidentially thought that pay ore will be found in this, as it is of a highly metalliferous character. The main south drift is still in good ore, and the prospects are promising. A two hundred horse-power engine has recently been put in place. The engine boilers are twenty-four by twenty-eight inches, and the shaft will be extended to a depth of two thousand feet. The pump is a thirteen-inch, with a capacity of seventy-five thousand gallons per hour, and adding the tanks, one hundred and forty thousand gallons per hour could be raised.

## BULLION.

This claim has two thousand five hundred feet, divided into forty shares to the foot, aggregating one hundred thousand shares. The company have levied forty-five assessments, aggregating one million eight hundred and two thousand dollars, the largest amount expended by any mine on the ledge, excepting the Ophir and Yellow Jacket, both of which, however, have disbursed large dividends. The south drift on the eight-hundred foot level, is in one hundred feet, finding nothing, so far, but quartz and porphyry. On the seventeen-hundred-foot level (the drift from the Imperial), quartz, clay, and porphyry is found. This drift is following along the west wall of the ledge, and cross-cutting will soon be commenced, where it is confidentially hoped something better will be found than heretofore. The stock last month was quoted at eighteen dollars per share, the same figure ruling at the same time the year previous.

## KENTUCK.

There is nothing new to report in regard to the condition of this mine. It has no hoisting works, and is being worked through the Crown Point mine. The shaft is down about six hundred feet in good milling ore. Work will be actively commenced in a few months. There are ninety-